SEP 17 1943

The OIL AND GAS JOURNAL

"Steeled" for Victory

The Steel Armor of American-made tanks helps protect Allied Arms as they move relentlessly forward—and part of this resistance to enemy fire-power began in our foundry with the production of cast steel armor for the latest models.

When the new M-5 light tank went into production, Hughes undertook the job of providing certain parts of its armor. The skill and experience acquired through years of making high-pressure steel castings for the Oil Industry enables us to carry out such assignments.

Tank Armor is only a portion of Hughes Tool Company's "Answer to the Call for Arms," which includes parts for guns, planes, ships, and tanks—*all this in addition to* **tools for the essential Oil Well Drilling Industry.**

HUGHES TOOL COMPANY

HOUSTON TEXAS

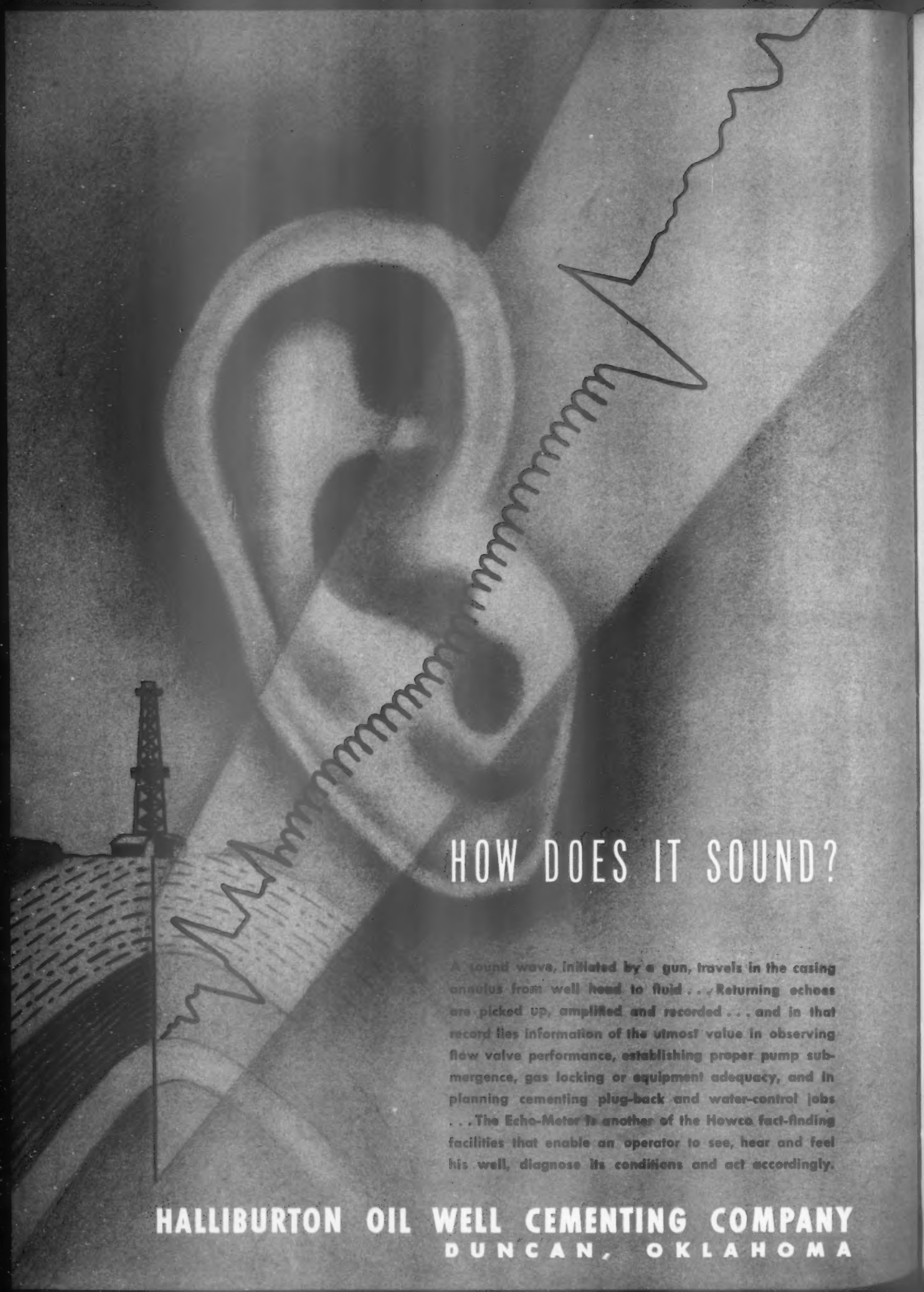
Senior Organization in Men and Management for

HUGHES AIRCRAFT STRUT DIVISION—DICKSON GUN PLANT
HUGHES AIRCRAFT CO.

41

Rock Bits—Core Bits—Tool Joints . . . are tools without which wells to produce the oil for the war machine could not be drilled. These ARE war products just as essential as the numerous *other* items we are making for the Army and Navy.

PRICE 20 CENTS SEPTEMBER 16, 1943



HOW DOES IT SOUND?

A sound wave, initiated by a gun, travels in the casing annulus from well head to fluid . . . Returning echoes are picked up, amplified and recorded . . . and in that record lies information of the utmost value in observing flow valve performance, establishing proper pump submergence, gas locking or equipment adequacy, and in planning cementing plug-back and water-control jobs . . . The Echo-Meter is another of the Howco fact-finding facilities that enable an operator to see, hear and feel his well, diagnose its conditions and act accordingly.

HALLIBURTON OIL WELL CEMENTING COMPANY
DUNCAN, OKLAHOMA

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1943, by The Petroleum Publishing Co.

Vol. 42, No. 19 September 16, 1943

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *News Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refinery Editor*

W. L. NELSON, *Technical Editor* — W. V. HOWARD, Ph.D., *Field Editor*

HARRY F. SIMONS, *Production Engineering Editor*

Associate Editors

LYNN M. NICHOLS — PAUL REED

NEIL WILLIAMS

District Editors

JAMES McINTYRE, Tulsa 1, *211 S. Cheyenne Ave.* — CARL HOOT, Tulsa 1, *211 S. Cheyenne Ave.*

THOMAS F. SMILEY, Houston 2, *Sterling Bldg.* — E. H. SHORT, JR., Houston 2, *Sterling Bldg.*

L. P. STOCKMAN, Los Angeles 14, *Union Oil Bldg.* — HARRY F. SIMONS, Fort Worth 2, *Petroleum Bldg.*

HENRY D. RALPH, Washington 4, *Natl. Press Bldg.* — TOLBERT R. INGRAM, Denver 2, *State Office Bldg.*

O. C. PRESSPRICH, Saginaw, *News Bldg.* — J. P. O'DONNELL, New York 17, *415 Lexington Ave.*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — A. C. MacINTYRE, Oil City, *Derrick Bldg.*

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, *Eastern Manager*, New York 17, *415 Lexington Ave.* — HOWARD MARKT, *Cleveland Manager*, Cleveland 14, *Leader Bldg.*

C. R. FARMER, *Chicago Manager*, Chicago 2, *105 W. Madison* — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, *1406 S. Grand Ave.*

WAYNE RIVES, *Gulf Coast Manager*, Houston 2, *Sterling Bldg.* — A. J. CHAMBERS, Twickenham (Middlesex) England, *72 Cole Park Road*

MITCHELL TUCKER, *Manager, Research Dept.*, Tulsa 1, *211 S. Cheyenne Ave.* — JOHN D. REILLY, *Production Manager*, Tulsa 1, *211 S. Cheyenne Ave.*

Member Audit Bureau of Circulations Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

PAW Spokesman Confident Of Price Advance in Near Future 22
Vinson's Decision Expected Soon 22
Temporary Agreement Signed on Elk Hills 22
Jersey Company Refutes Indictment by Wallace 24
Chemists Discuss Synthesis 26
Hugoton Line Apparently Favored Over Tennessee System 27
Technical Advisory Committee Praised for War Services 28
How General Petroleum Copes With Labor Shortage 30
Deaths 35

Trends 21 — Natural-Gas News 71
This Week 25 — Refining News 73
Editorial 29 — Pipe-Line News 76

ENGINEERING-OPERATING

Engineering Methods Coping With Cumberland Field Problems 39
Stabilizing Treatment, Tailored Control, Eliminate Scale 43
Cracking Technology—No. 3 53
Arc-Welded Housing for Open-Type Induction Motors 56
Oil-Well Pumping Practices—No. 12 57
Questions on Technology 62
American Chemical Society Abstracts 63

Book Review 51 — Cost Engineering 67
Operating Ideas 52 — Eng. Fundamentals 69

EXPLORATION AND DRILLING

Week's Highlights 79
Completions in All Fields 79
Daily Average Production for Week 80
Completions by Areas Start on Page 80

ADDITIONAL FEATURES

Drilling Contractors 92 — Equipment Progress 99
Personals 94 — Classified Advertising 101
Market Developments 96 — Calendar of Events 104
Refinery Prices 97 — Journalisms 104
Tank-Wagon Prices 97 — Advertisers' Index 104

Reproduction of a five-color poster carried by GSI recording trucks, currently being reprinted in newspapers where our crews are working. It bids for public cooperation to facilitate the search for oil, the keystone of the war effort.

Call in G.S.I.

GEOPHYSICAL SERVICE INC.

EUGENE McDERMOTT, President

SEISMOGRAPH SURVEYS

BRANCH OFFICE: HOUSTON, TEXAS

DALLAS, TEXAS

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 80

CRUDE PETROLEUM 4,339,615 bbl. daily average—up 94,745 bbl. One year ago 3,908,660 bbl.

CRUDE STOCKS 234,635,000 bbl. as of Sept. 4—down 1,535,000 bbl. One year ago 246,942,000 bbl.

GASOLINE STOCKS 71,402,000 bbl. as of Sept. 4—down 1,123,000 bbl. One year ago 79,093,000 bbl.

RESIDUAL FUEL-OIL STOCK 67,675,000 bbl. as of Sept. 4—up 425,000. One year ago 78,602,000 bbl.

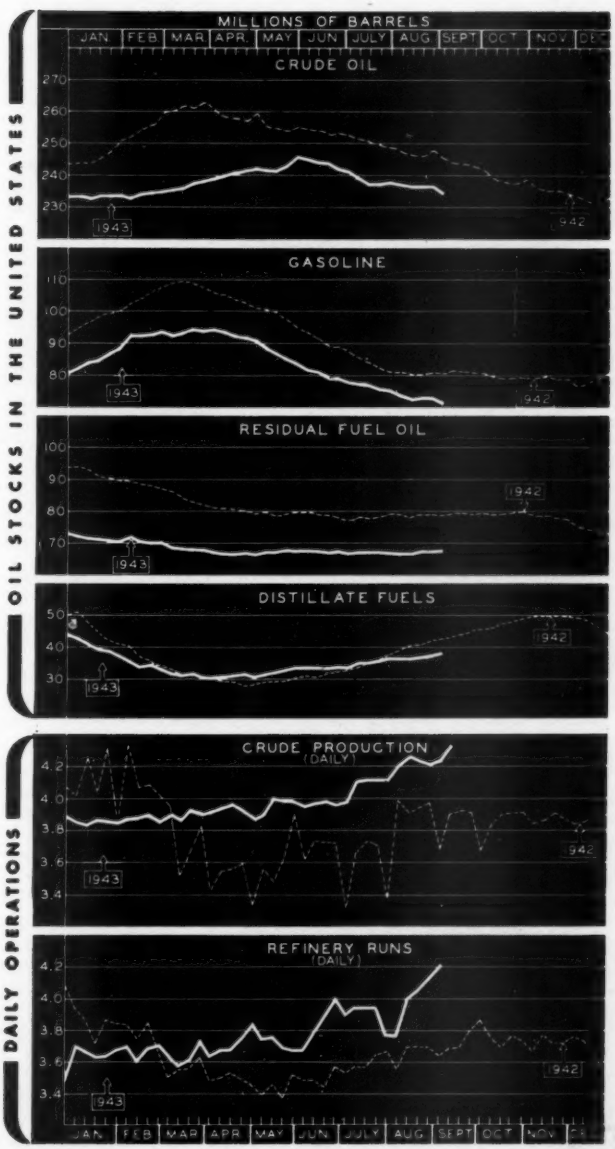
GAS OIL AND DISTILLATES 38,673,000 bbl. as of Sept. 4—up 745,000 bbl. One year ago 43,426,000 bbl.

REFINERY RUNS 4,214,000 bbl. daily week ended Sept. 4—down 13,000. One year ago 3,675,000 bbl.

AN October production quota of 1,199,000 bbl. daily for all petroleum liquids assigned this week to Texas apparently confirms the warning from Administrator Ickes that military requirements would continue their unprecedented rise. The national production quota for next month, not available in all particulars this week, doubtless will be above 4,600,000 bbl. daily, the highest rate of withdrawal ever assigned to domestic fields. Creation of new operating bases by the unconditional surrender of Italy and occupation of the southern part of that country merely add to the military consumption of petroleum. The stretch out of supply lines to new bases necessary to support the invading forces adds substantially to the fuel requirements. Furthermore, comparatively short range fighting planes can be returned to concentrated operation as rapidly as new air fields are secured in southern Italy.

DESPITE the anticipated record domestic production assignment next month plans are well advanced by the Office of Price Administration to tighten control over civilian-gasoline consumption. Smarting under the charge of inefficient rationing lodged last week by Petroleum Administrator Ickes, the OPA admitted that its new program was intended to remove all cause of criticism. The rationing clamps will be tightened on holders of B and C coupons, probably through a much more rigid control at local boards. Assertions that current consumption of motor fuel under the existing rationing program in the eastern states continues to exceed available supplies certified to OPA were repeated this week. The eastern supply quota is 342,000 bbl. daily. PAW affirmed that the prospects for increasing this volume are indefinite.

CONVERSATIONS in official petroleum circles are centering around creation of a world pool of supplies. Plans, because of their intimate association with military strategy, are nebulous. But the general objective would be to draw more liberally from South American countries which are anxious to bring their exports up to prewar levels or higher. Evidence that the plan is already functioning, at least in a preliminary way, is contained in reports that Venezuela's production has been increased and will be lifted as rapidly as possible to 1,000,000 bbl. per day, approximately three times the rate prevailing during the latter part of 1942 and the fore part of this year.



PAW Spokesman Confident Price Advance Will Gain Approval in Near Future

BELIEF that the price of crude oil will be adjusted satisfactorily was voiced in Tulsa last week by Wirt Franklin, special assistant to Ralph K. Davies, deputy petroleum administrator. Mr. Franklin, former director in charge of PAW District 2, is conducting a series of meetings at various producing centers of the country, encouraging operators to increase their exploratory efforts. He spoke before the Tulsa Chamber of Commerce.

He was unable to elaborate on his conviction that a satisfactory price adjustment will be forthcoming soon but his belief in an affirmative decision was so strong that he told operators to proceed with blocking acreage, purchasing protection and contributing dry-hole money just as though the raise already had been authorized. Numerous Mid-Continent operators were unable to share the optimism of Mr. Franklin although they agreed that his plea for increased exploration offered the only solution to the acute crude shortage.

Shortage Growing Alarmingly

Mr. Franklin sounded the warning that the current crude-oil situation was alarming and called on the industry to do all in its power to discover new oil fields.

"In 1942," he stated, "we withdrew and used more than twice as much oil as was discovered. On the other hand, demand for all petroleum liquids continues to increase, the requirements for September being 125,000 bbl. more per day than for August."

Mr. Franklin further stated that he had been informed by what he considered reliable sources of information that by the end of this year we would probably need 325,000 bbl. more per day than was produced in August.

"It is very apparent," he said, "that every barrel of refining capacity in the United States will be needed to win the war, and yet in District 2 alone over 30 of the smaller refineries might be closed because of lack of an adequate supply of crude oil."

Declaring that the primary responsibility for increasing the productive capacity of crude oil should rest with the industry, Mr. Franklin warned that operators cannot do the job required unless there is an increase in the subnormal level at which crude-oil prices were frozen.

"Price is the very foundation for the activity I am urging upon the industry," he continued. "Had there been no war, economic conditions would have caused an increase during 1941 of at least 50 cents per barrel for crude oil. Coming in that year, such an increase would no doubt have averted the shortage which we face today."

Mr. Franklin concluded with a strong appeal to the majors and larger independents to give every possible encouragement to wildcatters who have assembled a block and want to make a test of it. "These men," he stated, "usually know more about the area in which they are operating than anybody else for the reason that they operate in a restricted area, have grown up with it, have watched every well that's been drilled and come to conclusions often sound but sometimes in conflict with expert advice. Nearly 75 per cent of new discoveries are made by little fellows drilling at random on hunch or some information best known to them," said Mr. Franklin. "You larger companies can afford to take a chance and buy some of their acreage in order to help them finance the well—you must, because finding more oil is the industry's job."

Vinson's Decision Expected Soon

WASHINGTON, D. C.—Possibility that Economic Stabilization Director Fred Vinson will reach his decision on the proposed increase in crude prices within the past few days is seen here by officials directly concerned with the question.

Petroleum Administrator Harold L. Ickes, at his last press conference, said that he had not as yet heard from Judge Vinson on the matter, but explained that the director had requested additional information from PAW.

Rep. Wesley E. Disney of Oklahoma, one of the leaders in the fight for higher crude prices, said that he has received no word from Judge Vinson as yet, but expressed some hope that a decision will be reached shortly.

Mr. Disney reiterated his warning that unless the administration acts upon the crude price problem very soon, he will begin a drive in Congress for approval of his bill which would increase crude prices on an average of about 70 cents a barrel. The Oklahoman said that he will hold off for a short additional time, but will not wait long now that Congress has reconvened. He is not encouraged over the prospects for the increase, although he has said on several occasions that he feels that the industry will get a fairer consideration of its request from Mr. Vinson than it did from Price Administrator Prentiss Brown.

Vinson's office was handed the controversial proposal of Administrator Ickes for a 35-cent increase in crude prices after it was rejected for the second time by OPA. Immediately after receiving OPA's letter, Ickes appealed the adverse OPA ruling to the Office of Economic Stabilization which has been authorized by President Roosevelt to settle such interdepartmental disputes.

Temporary Agreement Signed on Elk Hills

WASHINGTON, D. C.—A temporary working agreement for the next 3 months has been negotiated between Standard Oil Co. of California and the Navy Department while final terms are maturing.

Standard of California has agreed, pending further negotiations during the 90-day period provided for in the temporary arrangement, to operate Navy's wells on an actual cost basis.

The amount expended by Standard of California in improving Navy's lands under the rescinded agreement, unless otherwise provided for, is to be reimbursed not in oil but in cash, subject to appropriation by Congress for the purpose. This expenditure is estimated at more than $500,000,

The question of what ultimately should be done about the Elk Hills reserve is being explored in the Navy and in congressional committees and

the secretary of the Navy has advised the president that he does not desire to make any final recommendations until Congress reconvenes and the opinions of all interested parties are obtained. In the meantime, the present agreement formally brings to an end the November 20, 1942 contract and protects the Government's interest against any drainage from its lands to the end of the 90-day period.

W. P. R. A. Arranges Special Paper on Cycloversion

A special technical group meeting will be held by the Western Petroleum Refiners Association at the Washington-Youree Hotel, Shreveport, La., at 3 p.m. September 24.

A paper on the "Cycloversion Process for the Manufacture of Motor Fuels" will be presented by C. J. Helmers, research department of the Phillips Petroleum Co., Bartlesville, Okla.

Cycloversion is of particular interest to the small and medium-sized refiners. Activity of the catalyst is unaffected by the presence of sulfur in the charging stock, making this process adaptable to existing cracking facilities.

Mr. Helmers will use slides to illustrate many of the important points of the process and will have a large flow sheet covering the reactions.

At the conclusion of his paper refiners may discuss in detail with Mr Helmers the adaptability of the process to particular plants.

Aviation-Fuel Production Diminishes Motor Gasoline

CHICAGO.—In an effort to correct what he called "the apparent misconception among rationed motorists that the more aviation gasoline produced the more automotive gasoline would have to be made," J. K. Roberts, director of research for Standard Oil Co. of Indiana, explained last week that the relationship between the yields of these two products is not as simple as is popularly believed.

"Before the war the production of aviation gasoline by the oil companies was quite small compared to that of motor gasoline," Mr. Roberts said. "Although certain of the stocks needed for the manufacture of aviation gasoline were normally considered as byproducts of the production of motor gasoline, and the yields of the two products were related to this extent, there was some flexibility in manufacturing operations." For example, he stated, certain stocks usually used for motor gasoline could be diverted to aviation blending, thereby increasing aviation production somewhat at the expense of motor-fuel production. This flexibility would permit manufacturing changes within limits but would not allow an appreciable increase in aviation-gasoline production by reducing motor-fuel manufacture.

"The demands for fuel oils have increased greatly because of the needs of the Navy, merchant shipping, war industries, etc.," he said. "Within the flexibility available in the refining industry the production of fuel oil has been considerably increased, more or less at the expense of motor-gasoline yields.

"The production of toluene for TNT manufacture and raw materials for synthetic rubber has also required that certain stocks previously used for motor-fuel production be diverted to these war products."

Priorities Revoked on Four Oil Projects

WASHINGTON, D. C.—The War Production Board last week revoked preference ratings previously granted to four oil companies for expansion of facilities. In all cases further construction was prohibited.

Additional tank-car unloading facilities at the Port Arthur, Tex., plant of the Texas Co. Preference ratings for this project, which had an estimated total cost of $48,000, were revoked when the applicant decided to postpone construction.

Assembly and installation of a bottle unscrambler, conveyor, filling machine and accessories for the Wood River, Ill., refinery of Shell Oil Co., Inc. Total estimated cost, $5,200.

Installation of additional pipe-line facilities at Pasadena, Tex., by the Crown Central Petroleum Corp., Houston, Tex. Preference ratings for this project, which had an estimated total cost of $16,524, were revoked when it was determined that existing facilities were available.

New facilities for the production of liquefied propane at the Baltimore, Md., plant of Standard Oil Co. of New Jersey. Preference ratings for this project, which had an estimated cost of $250,000, were revoked upon request of the applicant.

NEXT WEEK

The Annual Pipe Line Number

Included will be engineering and operating articles written exclusively for the Journal by top men in the transportation phase of the industry. More detailed highlights on contents of the issue appear on page 104 of this week's Journal.

Name of Another Pioneer Assigned Liberty Ship

WASHINGTON, D. C.—The name of Lewis Emery, Jr., a pioneer Pennsylvania oil operator, is to be honored by assignment to a Liberty ship now under construction. Mr. Emery entered the oil business in 1867 and was active in development around Titusville and Bradford, Pa. He was one of the organizers of the United States Pipe Line Co. which built a line from northern Pennsylvania to the Atlantic Coast.

The Liberty ship Lewis Emery, Jr., will be the fourth such vessel to be named for pioneer oil men. The others were for Patrick C. Boyle, founder of The Oil and Gas Journal and the Oil City Derrick, Edward L. Drake, and Orville P. Taylor.

Eastern Producers Hear Plea to Raise Output

OIL CITY, Pa.—A meeting designed to stimulate the production of crude oil in Pennsylvania was held at the Pittsburgh Athletic Club, Pittsburgh, Pa., September 16.

The meeting has been arranged by the Pennsylvania Grade Crude Oil Association in conjunction with the Pennsylvania Topographic and Geologic Survey, and representatives of the survey displayed maps and slides of various quadrangles completed by that state agency but not previously published.

Wirt Franklin, special deputy of the Petroleum Administration for War, discussed the wildcatting program, and it is believed that the information supplied by him and the survey will prove invaluable in formulating a program for the increased production of Pennsylvania Grade crude.

Texas' Production Quota Increased 90,000 Bbl. Daily

WASHINGTON, D. C.—The Petroleum Administration for War this week assigned Texas a daily production quota of 1,999,000 bbl. for all liquid petroleum products in October. This is an over-all increase of 90,000 bbl. from the approved rate of withdrawals in September.

Condensate and allied products accounted for 116,000 bbl. of the September production quota, indicating that the state will be expected to supply about 1,874,000 bbl. of crude daily next month.

Jersey Company Refutes Indictment by Wallace

NEW YORK.—An implied attack on Standard Oil Co. (New Jersey) by Vice President Henry A. Wallace in his Chicago address September 11 was vigorously refuted here this week by Ralph W. Gallagher, president of the company.

"Most people know," declared Mr. Gallagher, "that our efforts during the past 15 years in bringing buna rubber to the United States and in carrying out research and development here have been the very foundation of this country's synthetic-rubber program.

"Surely Mr. Wallace should be in a position to know that long before war came we had worked with eight agencies of our Government to establish synthetic-rubber production in this country.

"Surely he should be in a position also to know that we put to our country's use every bit of technical knowledge, all the 'know how' we had built up from years of research and experimentation; that our technologists were placed at the country's disposal; that we transferred permanently to our Government patent rights on buna-S rubber; that we developed butyl rubber in our own laboratory; that we learned new and better ways to make butadiene from oil; that we built pilot plants and that, 6 months before Pearl Harbor, we started construction of a commercial plant.

"It is unfortunate that Mr. Wallace has chosen to ignore the statement of William Jeffers, former rubber director, on June 6 of this year: 'Had it not been for the research and engineering development carried on by Standard Oil of New Jersey prior to Pearl Harbor, the synthetic-rubber program would be 1½ years behind what it is now.'

"It is also unfortunate that Mr. Wallace has apparently not taken the time to read the report of the National Patent Planning Commission transmitted by President Roosevelt to Congress on June 18, 1943. This report summarizes patents and the war effort by saying: 'This involves no serious problem since, under existing laws, the Government has the right to use any patented invention. Although full opportunity has been given, and specific inquiry made by the commission of the armed services, no evidence has been submitted of special instances of the use of patents to hamper the war effort.'

"Mr. Wallace has again resorted to the label 'cartel' to alarm the American public. With reference to cartels, I stated publicly some months ago a position I now repeat, 'I oppose cartels so far as our company is concerned, in any place, with all the vigor I have.'

Standard Refutes

In a supplemental statement issued September 14, the company expressed its views on cartels, a word which "has become the label of something bad." It has come to connote secret agreements and contracts with foreigners as well as a combination to fix prices and contral production.

"We do not believe," the company asserted, "in controlling production whether it is done by bureaucratic expedient or by business men behind locked doors of board rooms. When there seems to be overproduction it is the American way to use science in finding new uses for the product, to improve the methods of distribution so that the people can share what is being produced at a lower cost. . . . Like most American corporations we are dedicated to that American way."

The statement cited one notable exception, the congress-approved interstate oil compact created to conserve the nation's oil resources.

Ralph W. Gallagher, president of the Standard Oil Co. (New Jersey) took forceful exception this week to charges of corporate misconduct made by Vice President Wallace

"We do not believe in combinations to control price," the company declared. "Quite aside from any moral principle involved, we think it is folly for a business to believe that it can be secure in such an arrangement. Such a business has become defensive in policy. Sooner or later somebody is going to develop better ways to make the product more cheaply and then take the market away from the price-fixers. Like most American corporations our constant objective is to be that somebody.

"We are for business dealings with people in foreign countries. The American has traditionally roamed the face of the earth, bringing back new things to make life better and happier for our citizens, and carrying the gospel of the American standard of living to people in other lands. The bitter experience of two bloody and costly wars has shown that international trade must be increased, planned more intelligently, made easier—not frustrated or blocked. For one thing everybody seems to agree that basic raw materials must be more easily and more equitably available to people of all nations.

"We are against secret agreements. We think that secret agreements are a bad business policy, and that in our American democracy there is a fundamental reason for this position. In this country we are dedicated to the principle that the will of the people shall prevail. If this principle is to be effective, it means that people must have the facts on which to form their opinions.

"It has been our observation that the judment of the American public has been consistently right when it has the facts. . . ."

Wallace Says Subterfuge Throttled Competition

WASHINGTON, D. C.—Vice President Wallace, in a public statement issued here September 13, amplifying his Chicago address, declared that "the cartel of Standard Oil and I. G. Farbenindustrie" had engaged in "subterfuge, concealment and double dealing" to prevent rubber companies from developing synthetic tires from buna-S rubber. He charged that the oil company had offered competing firms a license agreement which would have "for practical purposes, prohibited the rubber companies from making tires."

Mr. Wallace said that Standard had "deliberately stalled some of the rubber and chemical companies in order to keep them from developing synthetic rubber" by processes jointly controlled by Standard and I. G. Farben, a German industrial firm. He quoted at length from testimony taken by the Truman investigating committee in its synthetic-rubber probe.

THIS WEEK

This concentration of inland-waterway petroleum-transportation facilities, tugboats and barges, was photographed recently at the Catlettsburg, Ky., river terminal of Ashland Oil & Refining Co. Greater use of the inland waterways is aiding in solving eastern-petroleum supply problems and in interior distribution

PRODUCTION—PAW increases Texas' October production quota to 1,199,000 bbl. daily for all petroleum liquids, up by 90,000 from September. . . . The rise covers about 25 per cent of reserve productive capacity in that state, available without excessive rates of withdrawal. . . . ¶Quotas for rest of country will lift national assignment above 4,600,000 bbl. daily, the highest rate in history. . . .

INTERNATIONAL—Secretary Hull excoriates Argentina in denying plea for lend-lease aid on petroleum equipment. . . . ¶Pooling of all production in control of United Nations receiving strong consideration. . . . E. DeGolyer, general manager Petroleum Reserve Corp., in Mexico, considering possibilities of increasing that country's crude output. . . . Figure of $50,000,000 for expansion or rehabilitation of Mexico's petroleum industry reappears. . . . ¶Petroleum Reserve Corp., chartered as subsidiary of RFC, transferred to Board of Economic Warfare, removing Jesse Jones as top policy maker. . . .

PRICES—Decision on appeal of crude-price advance imminent by Office of Economic Stabilization. . . . Congressmen prepared to push legislation for average advance of 70 cents per barrel unless Stabilization Director Fred Vinson or War Mobilization Director Byrnes act favorably in near future. . . . Rollback of food prices, promised by OPA, may be used as argument against lifting crude-oil ceilings. . . .

RATIONING—Tighter control over B and C coupons coming. . . . OPA smarts under criticism of Petroleum Administrator Ickes. . . . OPA charged with lax enforcement, with consistently exceeding the quotas certified by PAW, particularly in the eastern states. . . .

SUPPLIES—East Coast inventory index rises 1.2 points to 40.3 per cent of normal. . . . Stock position top heavy in residual fuel oil, deficient in gasoline. . . . Heating oils in reasonably sound position. . . . ¶Foreign crude-oil stocks decline 241,000 bbl. in a week, standing now at 1,010,000, partially offsetting previous week's increase of 653,000 bbl. . . . ¶Total crude-oil inventory falls 1,535,000 bbl. . . .

EQUIPMENT—Prospects improving for adequate steel for petroleum industry. . . . WPB and other controlling bureaus accepting higher appreciation of industry, realize its assignment in war program depends on more liberal policy concerning materials. . . .

DRILLING—PAW reappraising numerous fields, to determine where modified spacing regulations are justified, where a liberalization of restrictions would do most good.

TRANSPORTATION—Stanolind Pipe Line Co. files application with PAW for authorization to build line from Elk Basin, Wyoming, to its trunk system, leading to Missouri. . . . ¶Magnolia Pipe Line Co.'s West Texas 12-in. line to be started in November. . . . ¶Less than 30 miles of 20-in. remains to be laid to complete WEP product system from Texas Gulf Coast to Norris City, Ill. . . .

REFINING—Higher production quota assigned Texas indicates rail movement of sulfur oils to Middle West refineries will be started in near future. . . .

Chemists Discuss Synthetics

by Arch L. Foster

PITTSBURGH, Pa.—The weight of known domestic gas reserves is three-fourths of known liquid petroleum reserves, Dr. Per K. Frolich, research director for Standard Oil Development Co. and president of the American Chemical Society told 5,000 chemists meeting here last week. Reserves of gas, oil shale, tar sands are great enough that we will not need soon to go to coal hydrogenation as a commercial source of hydrocarbon-fuel requirements, he explained while outlining the methods and means by which continued and increasing demands for motor fuels and other hydrocarbon products may be met.

Abstracts of several papers presented at the annual meeting last week of the American Chemical Society, Petroleum Division, start on page 63 in the Engineering and Operating Section of this issue. They supplement this report on the meeting's general highlights.

New Petroleum Division Officers

C. R. Wagner, nationally-known petroleum refining consultant, was elected secretary of the Petroleum Division, A.C.S., a position he filled for many years until he joined the staff of the Petroleum Administrator early in 1942 in Washington. C. L. Brown, Standard Oil Co. of Louisiana, was reelected chairman. R. E. Burk, Case School of Applied Science, was named vice chairman.

The meeting has been outstanding in its presentation of the tremendous advances which are being made in chemical discoveries, advances pushed on at a greatly accelerated tempo by war needs. Just before the meeting, a process for the synthesis of triptane was announced, details of which are withheld because of its military importance. Triptane has been known and studied in small quantities for many years, but heretofore none has been able to produce it in quantity. Its synthesis by Ipatieff and Haensel opens a new avenue for aviation-fuel development.

In face of such discoveries, however, Egloff and VanArsdell brought out the fact that many countries, especially Australia and Brazil, possessing no petroleum production are building gasogene vehicles obtaining their fuel as it is needed by gasifying wood, coal, peat, etc. Australia is said to have 36,000 of these vehicles while 10,000 are running in the Brazilian State of Sao Paulo alone.

Most characteristic of the spirit of this meeting was the round-table conclave on pilot-plant design. So accelerated is the pace of development in petroleum chemistry that the pilot plant has taken on even greater importance in translating test-tube results into large-scale terms and conditions. Six discussion leaders directed the conferences on as many important phases of the subject, on compressors and pumps, control and measurement of temperature and pressure, etc. While much of the discussion was not released for publication, several general facts stood out. Pilot plants must be and are being designed to even more exacting standards than are commercial-scale plants. Control methods and equipment must be developed and maintained at the highest possible efficiency to permit experimenters to accomplish what must be done with pilot plants. Satisfactory pilot-plant operation requires the best trained and experienced personnel.

Conversion of Methane

Much of the general attention of the Petroleum Division as well as other groups in the society was given to methods for augmenting hydrocarbon supply. The U. S. Bureau of Mines is operating a small pilot plant for the synthesis of gasoline from methane gas by the Fischer-Tropsch process. This synthesis reacts methane with steam at elevated temperatures and pressures, forming carbon monoxide and hydrogen. The mixture then is catalyzed to combine the two into larger molecules of the gasoline or higher boiling ranges. While the process is interesting from a technical viewpoint it is not considered practicable at present, or until a much more serious shortage of liquid petroleum develops.

Ninety billion barrels of oil may be produced from oil shales located mainly in Colorado, Utah, Kentucky, Indiana, Dr. Frolich pointed out. Similarly it has been estimated that from 100 to 250 billion barrels of petroleum may be recovered from the tar sands in Alberta Province, Canada. Utilization of either of these sources presents the serious problem of disposal of the sand or shale after the oil is extracted, a condition which necessitates extraction at the point where sand or shale is mined. One practical difficulty is that relatively little of these two oil sources are available in an uncovered state; they must be mined as is coal with the exception of one small area where possibly a half-billion barrels of oil may be recovered from sand obtained by a strip mining.

Either tar sand or shale offer a more practicable oil source, however,

Dr. Francis C. Frary, director of research, Aluminum Co. of America; Dr. Per K. Frolich, director of research, Standard Oil Development Co., and president of the American Chemical Society, and J. C. Warner, Carnegie Institute of Technology discuss some of the intricacies of chemistry

than does coal by present hydrogenation methods, is the general opinion expressed by the chemical leaders. That research work on all these possibilities should be carried out is universally agreed but most feel that it should be on a small pilot-plant scale rather than in commercial units. This is believed to be desirable both from the viewpoint of cost and ease of operation and of unit flexibility.

One interesting angle brought into the discussion is the potentialities for organic chemicals containing sulfur and/or nitrogen from shale oil. Up to the present, this has been confined to the production of ammonia and its derivatives from Scottish shale-oil.

Speed and precision in control tests and analytical methods for following chemical reactions and keeping informed on the results being obtained by a process are becoming more and more important, as evidenced by the number of papers presented on these subjects. Steffens and Heath of Socony-Vacuum Oil Co., Inc., introduced an automatic gasoline-distillation apparatus, built around and for use with a Podbielniak unit. Determination of acidity in new or used highly colored oils such as lubricating oils containing additives, is done by a potentiometric method explained in great detail by Lykken and his collaborators of Shell Development Co. While not yet announced it is understood that important savings in time required to carry out analytical distillations are made practicable by new developments in this field. Precise analytical distillation and the spectrometer are the two means by which composition of mixtures is determined, a matter so important as a control routine in synthetic-rubber manufacture and in aviation-fuel production.

Hugoton Line Apparently Favored Over Proposed Tennessee System

WASHINGTON, D. C.—There were indications this week that the natural-gas pipe line from the Hugoton field, proposed by the Hope Natural Gas Co., will be favored by the Federal Power Commission when it reaches its decision on a new line from southwestern producing areas to West Virginia.

Although the hearing on the Hope application will not be held until September 21, the commission has concluded public hearings on the competing application of the Tennessee Gas & Transmission Co. to build a 24-in. line from Corpus Christi, Tex., to connect with existing distributing lines in the West Virginia area.

The commission will be forced to make a quick decision following the Hope hearing, since the War Production Board approved construction of the new gas line only on condition that pipe be ordered by October.

Two factors appear to dim the chances of the Tennessee company proposal. The company's ability to finance construction of such a large line, estimated to cost $54,000,000, was probed in detail by FPC Examiner Farrington, who presided at the hearing. When the commission in July announced that it would issue a certificate of necessity to the Tennessee company, it made it clear that the company must first show its ability to finance construction and operation of the line. As yet, there has been no specific assurance from the Reconstruction Finance Corp. that it will provide the necessary funds for the Tennessee company's line.

A growing opposition in Texas to the proposed export of such a large amount of natural gas to eastern consumers may also influence the final decision of the commission. While no official stand has been taken by Texas authorities, reports reaching here indicate that opposition to the gas line are widespread. When the big-inch oil line from Texas to the East Coast was first suggested, Sen. W. Lee O'Daniel of Texas vigorously opposed its construction on the ground that it might be converted to a gas line after the war and be used to ship gas from Texas to eastern industrial plants. Gov. Sam Jones, of Louisiana, resisted efforts of the Tennessee company to acquire gas in that state for a line from the Louisiana Gulf Coast to West Virginia, and the company subsequently amended its proposal to extend the line to Texas where officials contend they can get ample supplies.

Chairman Leland Olds of the commission, however, ruled that the commission is not at this time determining the need or desirability for the new line, but must act upon the WPB's order that such a line is needed for the war effort.

He made his ruling when Tom J. McGrath, representing both the National Coal Association and the United Mine Workers of America, challenged the need for a new pipe line from the Southwest into the Appalachian area where large deposits of coal and natural gas exist. As a result of this ruling, Examiner Farrington refused to permit witnesses to give evidence on the amount of gas needed in the area, and other factors bearing upon the necessity for the line.

In view of Chairman Olds' ruling, it is considered almost certain that one of the two lines will be approved and plans for its construction allowed to go ahead.

Both WPB and the Petroleum Administration for War have given their approval to construction of one of the two lines, Mr. Farrington disclosed at the hearing. He read a letter from the WPB saying that the pipe line is considered necessary to augment natural-gas supplies in the Appalachian region, which are being steadily depleted. In view of this, the board would make necessary pipe and other critical materials available for the construction of whichever line is decided upon by the FPC.

While the PAW did not take sides in the controversy between the two companies, it told the commission that its studies have shown that there is ample gas in the Corpus Christi area to provide the 200,000,000 cu. ft. daily which has been fixed as the amount required to supplement the Appalachian production. PAW estimated the reserves in that region to total approximately 3 trillion cubic feet.

At the present rate of consumption of the gas in the reserve, it will last approximately 100 years, PAW explained. If the additional withdrawal planned by the Tennessee company is allowed, the reserve will die in about 75 years.

The Tennessee company's proposed line would be 1,228 miles in length, of which 1,156 miles would be 24-in. pipe and 72 miles of 18-in. Under the terms of the WPB order, it must be ready for operation by the heating season of 1944. Officials of the company asserted that they could build the line within the time limit if given the certificate.

The line proposed by the Hope company, subsidiary of the Standard Oil Co. (New Jersey), would connect the Appalachian pipe-line system with the Hugoton field of Oklahoma and Kansas. Officials of the company have stated that if they are granted the certificate, they would finance its construction without government assistance.

Case-Pomeroy Co. Sells 53 Illinois Oil Wells

CENTRALIA, Ill.—The first National Petroleum Trust has purchased the oil interests of the Case-Pomeroy Co. in the Illinois basin for an undisclosed sum. The deal includes 53 producing oil wells with an average daily production of about 1,200-bbl. and 9,000 acres of leases.

Technical Advisory Committee Praised For War Services

by W. R. Boyd, Jr.

High praise for the achievements of the technical advisory committee of the Petroleum Industry War Council was given this week by W. R. Boyd, Jr., chairman. This outline of the accomplishments of TAC, how it functions in development of processes indispensable to the manufacture of petroleum war products, was prepared by Mr. Boyd to show how scientists of the industry have attained near miracles in production.

CREDIT for the wartime refining achievements of the petroleum industry is shared by the oil companies, the petroleum administrator's staff, the PIWC's aviation gasoline advisory committee, and many others, but one of the agencies responsible in large measure is the seldom-mentioned technical advisory committee. This group of scientists representing a cross-section of research organizations in the petroleum industry, was formed in October 1942 to correlate the research and development on petroleum war products under the direction of the council and in collaboration with the petroleum administration.

The volume of research in petroleum has been one of the astounding developments of the last decade. Before the war, according to a number of surveys, no other industry could match its progress. Every large oil company has its staff of scientists, and smaller companies command the brains and services of several large organizations which specialize in petroleum research. Altogether upwards of 5,000 scientists have been working to find new uses for petroleum, to make present products better. In one decade the petroleum industry virtually has been transformed into a chemical industry.

That is the research team which has been harnessed in the technical advisory committee (TAC) to perform the necessary miracles to help accomplish the impossible in war production of petroleum products. Many of the accomplishments of the TAC cannot be known until after the war. Secrecy applies to research and development advances just as much as it does to munitions production and troop movements. But some of its achievements and the manner in which it operates can be described.

Superaviation Fuel

Early in 1941 some conception of the huge future demand for superaviation gasolines was evident. The refineries already making 100-octane gasoline and those scheduled for completion by the end of 1941 could produce little more than 40,000 bbl. daily.

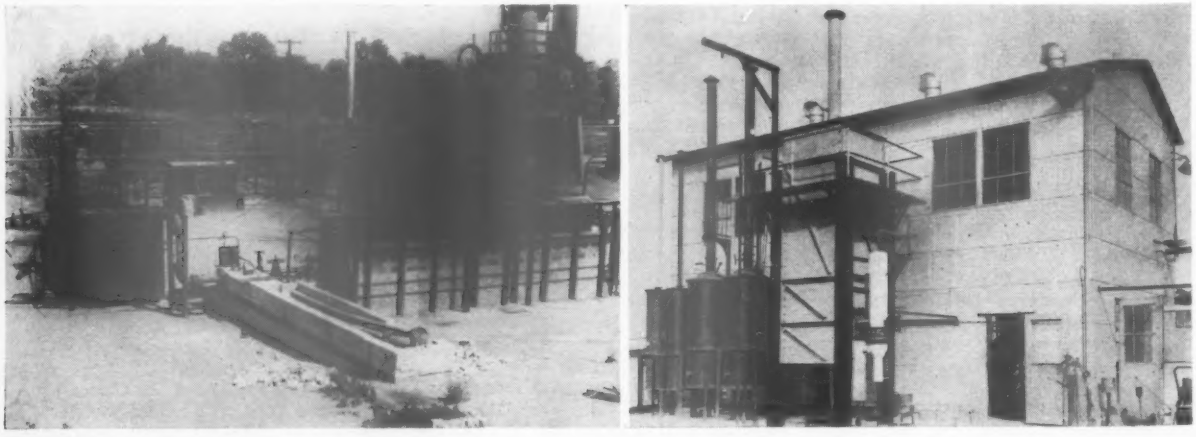
Though at that time the petroleum industry was unable to operate even these plants at full capacity, for lack of orders, Petroleum Administrator Harold L. Ickes and industry leaders recognized that the future surely would bring demands that could not be met with these plants. The obvious answer was more plants, and by the middle of the year the groundwork for a program of new construction was laid down.

But new plants, as complicated and as prodigal of critical materials as are 100-octane units, cannot be built overnight. None of them was completed on December 7 when war brought crisis to all production programs.

In the emergency the 40,000-bbl. capacity was jumped overnight to almost 50,000 bbl. a day by the simple expedient of increasing the permissible content of tetraethyl lead from 3 cc. to 4 cc. per gallon. But that was then believed to be just about the top production possible from the existing plants.

The war could not and would not wait, however. Miracles were neces-

(Continued on page 32)



General view of experimental plant area (left), showing glass bath heat exchanger, soaking coil, cooler box and gas disengaging drum. Right: Pilot unit for investigating advanced cracking process

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Lesson for Strategists

UNCONDITIONAL surrender of Italy, not to discount its highly gratifying military aspects, confirms a concept of international power which may hold pointed significance for the high strategists of this country.

Underlying the inherent weakness of Italy was its poverty in petroleum. Somewhat surprising was the ability of Italy to sustain an untenable position for so long. Participation in the global war until last week, even on the modest scale assigned to Italy, was possible only because she prepared several years for her infamous role as a Nazi satellite by storing large quantities of petroleum supplies.

Imports rose sharply in prewar years from Rumania. A unilateral trade was worked out with Mexico by which Italy received several million barrels of oil from that producing country. Mexico, of course was supposed to receive several new ocean-going tankers in payment for the oil she was shipping to Italy. Defalcation of Mussolini's government on its end of the oil barter proved to be mild in comparison with the subsequent breaches of good faith.

Viewed from another angle, Italy's prostitution of national integrity in the abrogated agreement with Mexico emphasizes the extremes to which she was willing to go for a few million barrels of oil. The amount actually delivered was considerably less than the United States produces in a week. Italy's plight for petroleum was so desperate that she could risk the stigma of accepting goods under false pretenses for a few barrels of petroleum.

The warning sounded by Italy's collapse well may be heeded in the United States. Certainly we are approximately 4 million barrels of oil daily better off than Italy. It doesn't necessarily follow, however, that this full margin of supremacy can be maintained.

Consequently, the acute shortages of oil in parts of this country may be examined in the perspective of what happened to an enemy country which did not have enough petroleum.

The parallel between petroleum supplies in Italy and the United States is overdrawn objectively. There is every indication that this country's production will fail by about 500,000 bbl. daily to equal the mid-1944 demand. This is far too serious a shortage to longer tolerate the obduracy of the Office of Price Administration. The stakes in this global war are much too high to further delay a complete test of what the oil industry unanimously asserts will arrest the declining reserves and productive ability.

The industry is obviously willing to risk its long record of successful operation on the historical truth that price finds oil. Certainly the least the industry can expect is an opportunity to prove its point.

The profit windfall which OPA scorns and which it holds up as the chief objection to a 35-cent advance would amount to slightly less than 6 per cent of the total increased revenue.

Unless the price-controlling bureaus which have repeatedly rebuffed the industry and the PAW abandon their obstructionist tactics promptly, it is time for Congress to act. Too often Congress must chop up the whole apple to remove a rotten spot. For that reason OPA and the Office of Economic Stabilization are obligated not only to correct an error in judgment by lifting the crude-price ceiling but also have a patriotic mandate to reverse the trend in petroleum supplies without forcing an overthrow of the entire anti-inflation machinery.

Charles Francis, pipe bender subforeman, Torrance refinery, standing beside a pipe-bending machine he developed which saves many man-hours of work. He won a sizeable award under the company's suggestion plan

How General Petroleum Copes With Labor Shortage

IN the conviction that there are too many unforeseen and varying factors affecting manpower problems for any single plan to meet every contingency, General Petroleum Corp. of California relies largely on the initiative and loyalty of its personnel to solve each problem as it arises. Such a flexible program has thus far proved equal to every emergency.

Of course the corporation is making the best possible use of womanpower in its organization. In addition to a marked increase in the precentage of women employed in virtually all types of clerical and office jobs, General Petroleum has women lawyers, chemists, bottle washers, "bargemen," and "warehousemen," and there is a woman sales assistant to the manager of one of the large Southern California marketing districts. No women have yet been employed in production or refining operations involving manual labor, but adaptation of such work to the fair sex is under consideration. Women in service stations have come to occupy a predominant place in this field of operation.

Training programs for specialized work are increasing withing the corporation, such as classes in foremanship, refinery operation, and dealer selling, and a plan is being fostered to emphasize to every worker the vital importance of his job to the war. The Socony-Vacuum-produced motion picture, "Only an Informed America Can Be an Invincible America," dealing with the importance of every petroleum industry job, is being shown to workers throughout the organization, and emphasis is being placed on the war value of oil workers through the medium of the employe magazine "Doings in General."

The corporation has found that the

Mrs. Olive E. Boswell, one of the women attorneys at the Los Angeles office

J. P. Samuelson, farm overseer, gave up scheduled retirement and elected to stay on the job for the duration

Alma Bardeleben, tracer, completes job while Pat Warne, junior draftsman, waits to take it for further processing. Donna Miller is busy at the center table. Out of place feels Al Frank at the rear

One of the classes in instrumentation which will help solve the manpower problem when the company's 100-octane gasoline plant goes on stream. Class is conducted and attended by employes and is operated in conjunction with the war-training program of the Los Angeles city schools

This is another of the Journal's reports on how oil companies are maintaining maximum operations required by the rising military and essential-civilian demand for petroleum products under the handicap of manpower shortages.

General Petroleum Corp., as this story relates, leans heavily on the recruiting potentialities of its own organization to keep its manpower at the necessarily high level.

Numerous employes, eligible for retirement, have remained active in order to mitigate against acute labor deficiencies.

Training is a vital part of the program, preparing operators to man the new war plants as they are completed.

This report was prepared by General Petroleum's personnel staff.

Alice Y. Johansen, one of the women chemists engaged in the Vernon, Calif., laboratory, conducting an experiment

Nell Hayes, Colton district sales assistant. She is the first woman to hold this position with the company

Mrs. Mettler working on the barge Diamond Head at Lake Union, Seattle, Wash., delivering petroleum products to terminals in the Pacific Northwest

older (40 plus) worker is normally an effective worker, and it has gone so far as to make special efforts to recruit older men virtually throughout the organization. Many annuitants have been recalled from service, others due to retire have voluntarily consented to remain on the job for the duration.

Employe loyalty and initiative in helping the corporation meet its worker needs is, however, the most outstanding single means by which the company is solving its emergencies as they arise. This is demonstrated by the willlingness of these retired and ready-to-retire workers to continue the job. It is evidenced by the efforts of employes to bring their friends into the corporation fold. It is evidenced by the willingness of employes to sacrifice their personal comfort in event of emergency to keep the oil flowing. Office workers at Seattle, for example, donned overalls to load a lend-lease ship when a shortage of longshoremen would have delayed sailing; another group of employes worked all night to keep fuel oil going to a Boeing Aircraft plant when a storm shutdown normal river transportation.

Two labor-saving devices have been included among the many available ideas submitted recently by employes through the company suggestion plan. Under this plan employes receive substantial awards for their ideas, and General Petroleum has found that consistently pushing this plan pays dividends. Literally hundreds of acceptable ideas have been received which have effected increased efficiency and economy in virtually all departments.

R. F. Grant, electrican subforeman, engineering and construction department, Vernon, has given up retirement for the duration to help the country and company over a rough spot

Technical Advisory Committee Praised

(Continued from page 28)

sary. And in the 18 months since Pearl Harbor the oil industry's scientists have accomplished those miracles, sweating more aviation gasoline from the existing plants.

The methods used have been many, because, fortunately, superaviation gasoline is not one product, but may be any one of several. Basically it is a blend of selected hydrocarbons — a high-grade base-stock gasoline, a high-octane blending agent such as hydrocodimer, alkylate, cumene, or some equivalent, isopentane, and tetraethyl lead. Any one of a number of combinations of these constituents makes high-octane aviation fuel, and the work of the scientists has been to discover new ways of making increased proportions of the known valuable constituents, and to discover new ones that can be substituted to increase production or raise the quality — largely by using existing refining equipment.

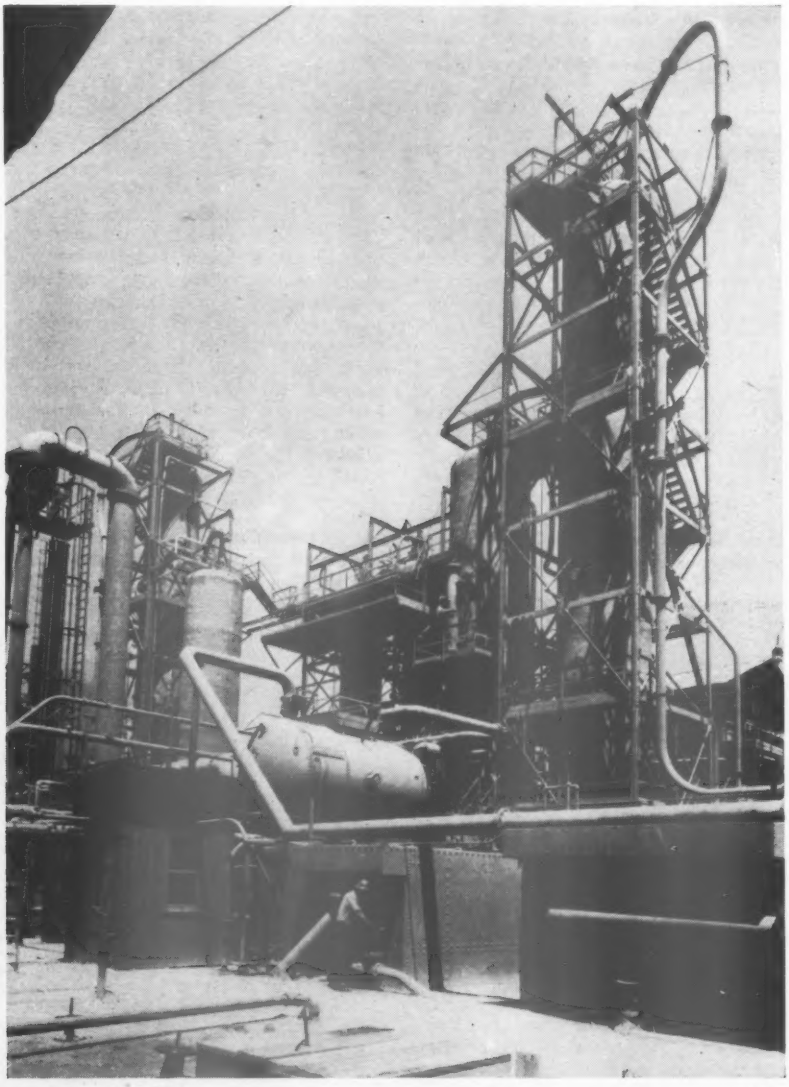
Whereas before the war each manufacturer of 100-octane gasoline had what was essentially an integrated operation in his own plants, the emergency brought a new conception—the integration of all the refineries and natural-gasoline plants in the country that could contribute in any way to its production.

Refineries that never thought of themselves as manufacturers of aviation gasoline now, however, make one or more of the constituents—codimer, perhaps, or cumene, or alkylate, or even some of the raw material hydrocarbons like isobutylene which are a first step in the manufacture of the blending agents.

Each plant makes what it can, and ships it to another refiner for further processing or for blending. Thousands of tank-car loads have moved and are still moving from one refinery to another in a highly integrated interplant combine that is pushing aviation-gasoline production to constantly greater peaks.

Thus, even without the new plants, the petroleum industry has come through with many times the quantity of aviation gasoline that anyone thought possible 18 months ago. Perhaps even more important, the average quality has jumped much beyond the prewar level of "super" 100 octane. And when it is realized that every small increase in octane number automatically decreases the overall productive capacity, the job that has been accomplished seems even more astounding.

Petroleum Administrator Ickes has paid tribute to these miracles many times, and recently he quoted an Army general: "The job which has been done with 100-octane by the refinery experts of your staff and of the oil industry is one of the most amazing things I have ever witnessed. It is almost unbelievable. They have virtually squeezed it out of a hat."



Cracking coils that have been converted to the production of butadiene

Central Clearing Medium

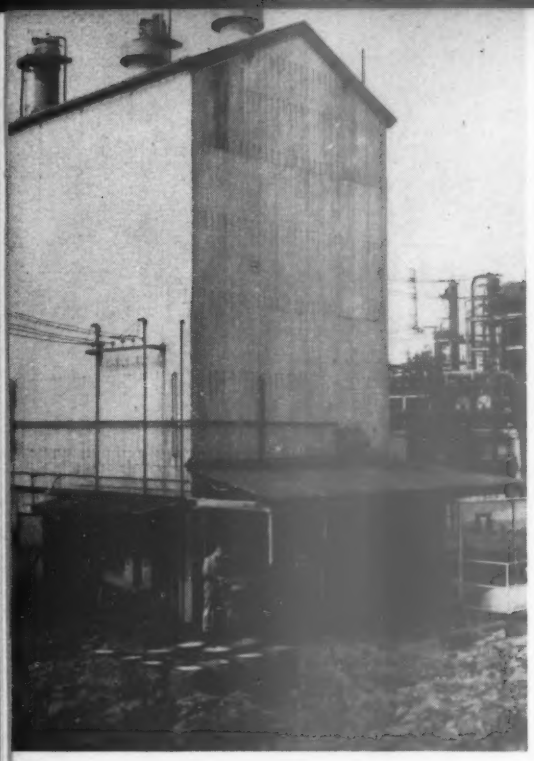
The role of the TAC in this amazing achievement has been that of collector, correlator, and disseminator of the information which showed the individual plant operators what could be done with their equipment. Many of the things it has done were, of course, being done on a limited or uncorrelated basis, by the oil companies themselves, and through the advisory supervision of the petroleum administration. But since the TAC has assumed responsibility under the direction of PAW, the volume and direction have increased enormously.

In the spring of 1942 aviation gasoline, politics, and even the war were momentarily forgotten in a great nation-wide furor about synthetic rubber. The whole story is too long and too widely published to be retold here, but it was that controversy which was responsible for TAC.

In October 1942 the author, as chairman of the PIWC, appointed a technical committee with Dr. Robert E. Wilson, president of Pan American Petroleum & Transport Co., New York, as chairman, and with R. H. Colley, president of Atlantic Refining Co., Philadelphia, and W. S. S. Rodgers, president of the Texas Co., New York, as members, to supervise the activities of a new technical advisory committee to be appointed with the older rubber committee as a nucleus.

Since then the TAC, with Dr. T. G. Delbridge of Atlantic Refining Co. as chairman, and K. G. Mackenzie of the Texas Co. as secretary, has expanded its membership and its activities widely, and is today a spearhead

HANDLE WITH CARE
For
Extra Service
YOUNGSTOWN oil country tubular goods are manufactured from the best steel that it is possible to produce for this purpose. This steel is fabricated by highly skilled workmen using equipment of the most modern design. The standards to which these products are made--particularly the threads--involve tolerances as low as a few thousandths of an inch.
Careful handling of this type of material in the field has always been important. In the present emergency it is doubly so. All-out effort for war has necessitated a curtailment of a large percentage of tubular products for oil field use. The adoption of a definite and aggressive program covering the transportation, storage, handling and reconditioning of casing, drill pipe, tubing and line pipe will result in prolonging the life of the available supply. Following simple maintenance precautions will return tangible dividends in extra service. Our engineers will be glad to consult with you on your conservation program.
nd the Trade Mark?
QUALITY
TRADE MARK
YOUNGSTOWN
SERVICE
The YOUNGSTOWN
SHEET AND TUBE COMPANY, Youngstown, Ohio
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS
Pipe and Tubular Products ... Sheets ... Plates ... Conduit ... Bars ...
Tin Plate ... Rods ... Wire ... Nails ... Tie Plates and Spikes



An alkylation pilot plant

and clearing house of the oil industry's research and development activities on several petroleum war products. The 20 members of the committee are from all parts of the country, and as far as is known every oil company which has research and development facilities that can be of assistance in its work is represented on the TAC.

The main committee meets about six times a year, but the work is directed continually by the smaller executive board, meeting every 2 weeks, and by Albert E. Miller, of the Sinclair Refining Co., secretary of the board and a member of each of the subcommittees, who is in full-time charge of the committee's staff.

Three Working Subcommittees

All projects come to or through the three active working subcommittees: Analysis, Harry Levin, Texas Co., chairman; primary processes, P. J. Harrington, Standard Oil Development Co., chairman; and synthesis, H. W. Field, Atlantic Refining Co., chairman. Many reports of the latter two subcommittees go through the correlations group, under W. E. Chalfant of Atlantic, which sorts out the various reports and puts them together as a unified whole. Mr. Miller, as a member of each of the subcommittees, acts as a coordinating member so that everyone will be continually informed of what all others are doing. He also, through weekly contacts with the refining division of PAW, keeps the committee groups and the PAW aware of all developments as they occur.

The actual office expenses of the committee are paid by the oil industry itself through the PIWC, but all of the time of all individuals in these many groups is donated by their companies.

The work of TAC as an entirely voluntary industry organization is nominally under the direction of the PIWC and its technical committee on broad matters of policy. In its day-to-day activities, however, its close-working relationship is with the refining division of PAW, which presents research and development problems to the TAC for assistance.

Broadly, its declared functions are "to conduct or promote voluntary cooperative research and development work in the fields of manufacture and utilization of petroleum products for war," with these specific duties:

1. To collect and correlate available basic technical information.
2. To obtain when needed further information through voluntary research and development work utilizing laboratory, pilot unit, or full-scale plant equipment.
3. To transmit such information to the PAW and to such other government agencies and individuals as shall be specifically designated by the Petroleum Administration for War.

Under this arrangement the TAC issues two principal types of reports: Digests of a number of reports and all available information on certain broad subjects, such as alkylation, in which are also included data developed specifically for the committee to fill gaps which become apparent when the reports are correlated; and separate reports of individual companies which are reproduced and issued by the committee "as is."

The specific subjects which are studied by the committee, and the distribution of its reports, are governed by the PAW. Within these broad but specified limits, the TAC receives reports from all petroleum-research organizations and from many outside organizations, companies, and individuals. It correlates the data on similar subjects in its correlation group, studies the data in its subcommittees, requests assistance from any research organization which has the proper facilities and personnel to undertake investigations to fill in missing data, and digests the entire mass of information into comprehensive reports which are directly applicable to refinery operations.

The work of two or more companies on the same or similar subjects can thus be evaluated, combined, and correlated so that duplication of research is held to a minimum, and missing parts of research and development puzzles are readily apparent. Often other companies, qualified by equipment, personnel, or some other reason, are asked to study problems not their own to fill in missing pieces. In the same way, methods which look good in the laboratory stage are tested in pilot plants, those that appear to be valuable in the pilot plant are tested in full plant operation, wherever the facilities exist to do the job best.

All of the research data are contributed voluntarily to the common pool, regardless of the cost to the original owner. In no instance has any information been refused, the committee reports. In one 4-month period last year, when the synthetic-rubber research was being conducted, more than $1,000,000 was voluntarily spent by the participating oil companies in research for the committees.

The same working relationship is carried on with chemical, construction, and other organizations and individuals outside the petroleum industry which may have pertinent research data to help solve petroleum research and development problems. Many such companies and institutions have volunteered highly important information to the petroleum war effort through TAC.

So far the major part of the work of TAC has been in synthetic rubber (many problems of which are still being investigated, despite the ending of the "quick butadiene" emergency) and in aviation gasoline. However, the setup of the committee is such that it is instantly available to help solve any research and development problems of petroleum war products, and it is expected that its activities will be broadened as these problems arise.

Alkylation

One of the best concrete examples of the way in which the TAC works is its continuing study of alkylation. This dates back to its original synthetic-rubber study, for part of that investigation was concerned with flexon, the butyl rubber, the raw material for which is isobutylene.

But isobutylene is also a prime olefinic raw material for alkylation into high-octane blending materials for aviation gasoline, and TAC could not recommend its use for rubber unless it could also offer substitutes. This led to a study of the increased use of other olefins, such as amylene and propylene, both in sulfuric acid and hydrofluoric acid alkylation.

TAC therefore set to work to assemble everything known about both types of alkylation in one comprehensive report. This revealed that there were a large number of gaps in the known data, and several companies were asked to go to work at top speed to fill in those gaps.

All of this work was done through the synthesis subcommittee, but the study soon became so broad that both of the other subcommittees were called in. It was not enough to emphasize, as the synthesis subcommittee's reports did, that the other olefins could be alkylated successfully. Their use was so new that very little was known either about methods of identifying, making or purifying them in normal refinery operations.

The first problem was assigned to the primary processes subcommittee to develop methods of manufacturing these other olefins in ordinary thermal cracking and fractionating facilities; the second was given to the analytical subcommittee to find an answer, for obviously no refiner could be asked to manufacture something he could not identify.

Together the three subcommittees developed methods of analysis and manufacture of olefins, and better methods of synthesis in alkylation which have been introduced in many refineries and have contributed immeasurably to the production of aviation gasoline. Unfortunately war secrecy prohibits the publication of production figures which would reveal the tremendous increases in alkyate manufacture. Even were it possible to give these figures, it would be extremely difficult to assess the contributions of the TAC work in comparison with those of other groups which have helped, but there is no question that millions of gallons of aviation gasoline now being burned in Allied planes all over the world were made possible by its studies.

Ethylbenzene, Codimer

Also as part of its rubber investigations TAC early undertook the study of the manufacture of ethylbenzene, a product of the utmost importance in the manufacture of styrene for synthetic rubber. Oil-industry research already had indicated a possible solution to the problem of making ethylbenzene from alcohol, and TAC investigations in the laboratory proved that it could be made by the modification of a petroleum refining process.

This method was tested in plant operation and proved workable. Now it is being used on a commercial scale for the production of ethylbenzene at an Ohio plant.

When TAC undertook research and development in aviation gasoline this early experience with ethylbenzene became extremely valuable because the same type of plants which were studied for ethylbenzene, the dozens of poly units scattered over the country, were the units best equipped for the production of codimer, now a most important raw material for high-octane blending stocks.

Although research had demonstrated the value of codimer, production was comparatively small. Today it has become a very important source of high-octane material. TAC has been of constant help, ever since it was organized, in increasing production of codimer plants already producing it, and in demonstrating to other plants how it could be made by slight changes in refinery operations or by small conversions of existing facilities. A number of plants which have adopted the TAC methods have more than doubled codimer production in a minimum of time.

Other codimer studies revealed the relative value of using it as a feed stock for alkylation, or of hydrogenating it to hydrocodimer. From these studies it was possible to reshuffle some operating programs, shipping codimer to hydrogenation plants that had excess capacity, and releasing alkylation capacity for other raw materials.

The committee's work with aromatics has also been of great importance in the rise of aviation-gasoline production and quality. Most of the low-carbon alkyl benzenes are highly useful as high-octane blending materials, and TAC has done and is still doing a great deal of research and development with them. Cumene, of course, is the most prominent example.

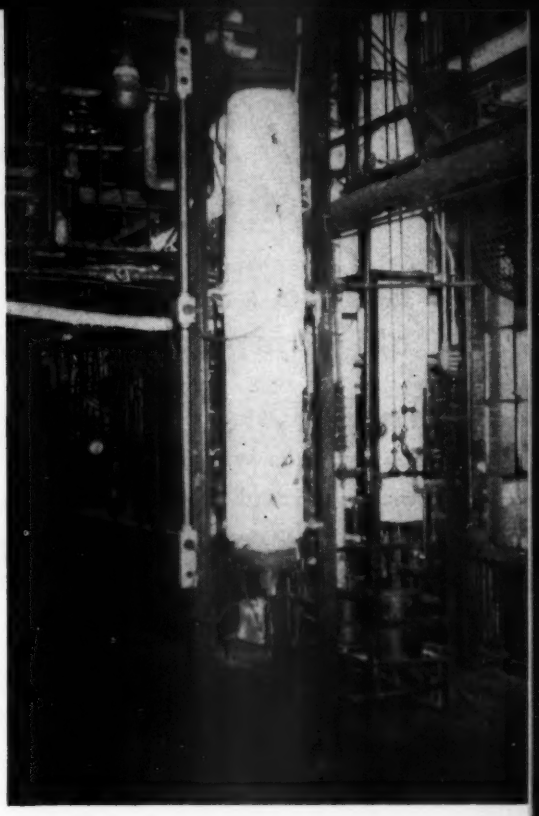
Altogether it is not too much to say that the work of TAC on alkylation and codimer production, and its subsequent study of aromatics, have proven of inestimable value in the production of aviation gasoline, and have made possible to no small degree the utterly incredible increases which have been achieved with existing facilities. These same discoveries, of course, have been used to modify or change the new plants as they are being built, so that their actual capacities will be much greater than those for which they were designed.

Since it first began working, TAC has distributed 164 reports to mailing lists, some of which run as high as 650, depending upon the nature of the reports and instructions from PAW as to their distribution. In the month of June alone 19 reports were prepared and distributed by the committee.

The membership of the TAC represents a cross section of the petroleum industry's extensive and able scientific personnel.

The membership of TAC is made up of the following individuals, each of whom has an alternate from his company:

T. G. Delbridge, chairman, Atlantic Refining Co.; K. G. Mackenzie, secretary, the Texas Co.; Eugene Ayres, Gulf Research & Development Co.; D. E. Carr, Union Oil Co. of California; D. E. Day, Richfield Oil Corp.; R. A. Halloran, Standard Oil Co. of California; H. Y. Hyde, Tide Water Associated Oil Co., Inc.; E. W. Isom, Sinclair Refining Co.; W. W. Lowe, Cities Service Oil Co.; E. B. McConnell, Standard Oil Co. (Ohio); Walter Miller, Continental Oil Co.; L. W. Moore, Pan American Petroleum & Transport Co.; G. G. Oberfell, Phillips Petroleum Co.; A. E. Pew, Jr., Sun Oil Co.; D. Pyzel, Shell Oil Co., Inc.; J. B. Rather, Socony-Vacuum Oil Co., Inc.; J. K. Roberts, Standard Oil Co. of Indiana; W. B. Ross, Pure Oil Co.; R. P. Russell, Standard Oil Development Co.; H. D. Wilde, Humble Oil & Refining Co.



Ethylbenzene and cumene pilot plant

DEATHS

Charles C. Stoll, 82, founder and president of Stoll Oil Refining Co., Louisville, Ky., died in that city September 5. Mr. Stoll entered the oil business in 1881, and had been engaged in it for 62 years. He had been granted a place of special distinction in the Twenty-Five-Year Club of the Petroleum Industry.

F. L. Anderson, 43, drilling contractor of Bradford, Pa., during the past 17 years, died at his home in that city last week.

R. G. Bray, 38, for the past 14 years associated with Union Oil Co. of California, the last 3 of which he was refinery manager at Oleum and at Wilmington, Calif. At the time of his death he was on leave of absence from Union with Petroleum Administration for War.

Robert H. Fitzgerald, former drilling contractor and oil operator, died of a heart attack in Orlando, Fla., where he had lived since his retirement 5 years ago. Mr. Fitzgerald began working in oil fields when he was 15 years old, and had followed the industry for 55 years. A former resident of Tulsa, he was one of the founders of Independent Eastern Torpedo Co.

Frank Moncus, 36, an independent oil operator and resident of Houston, Tex., for the past 8 years, was killed when his automobile collided with a truck parked on the highway, near Edna, Tex.

An Engineer's Dream

How a simple five-year plan literally *gave* an oil company its own gas-electric power plant

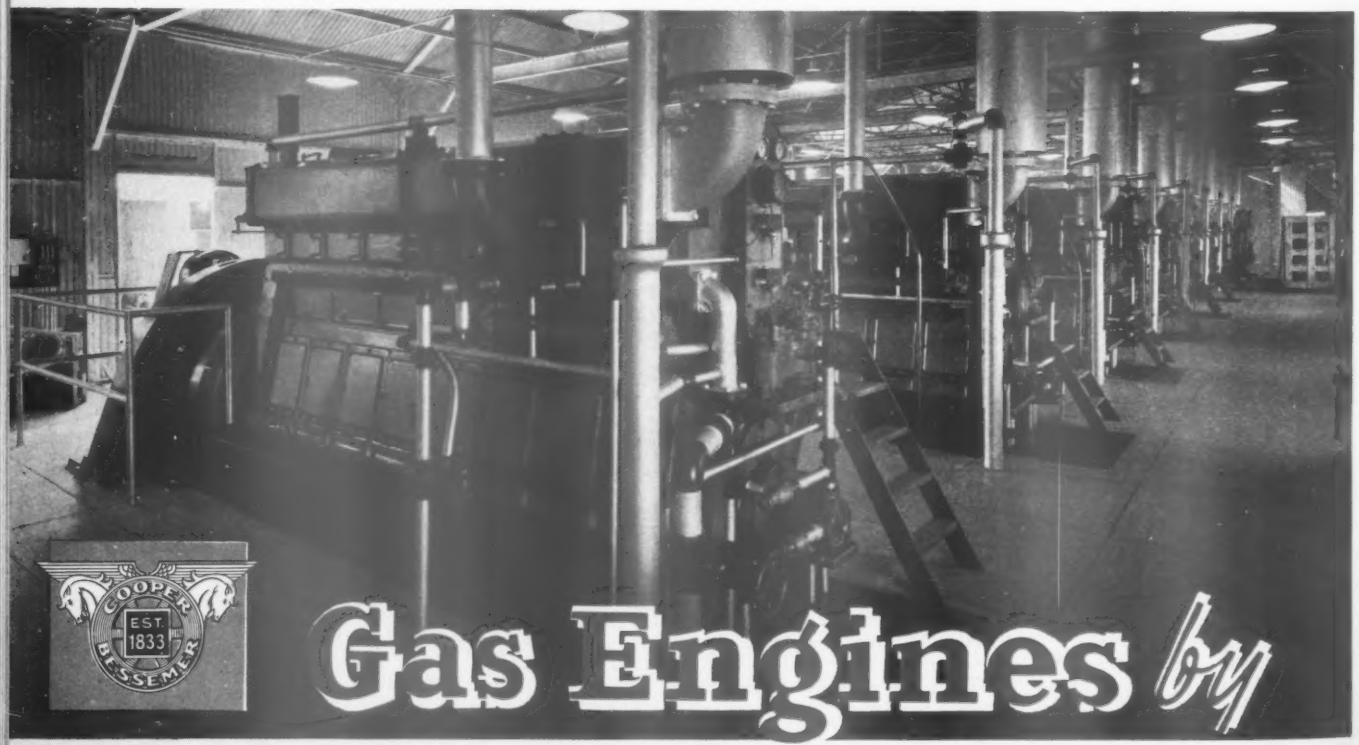
At Fittstown, Oklahoma, an oil company pumps its wells with power from its own electric plant, installed in 1936-37. Generators are driven by seven 8-cylinder, 400 hp Cooper-Bessemer engines, fueled by gas from the company's own wells.

Before the plant was built, a 5-year pay-out plan was set up. This program was improved upon in actual operation. Cost of the plant was only $110.65 per KW capacity, against an estimated $120.00. Figuring otherwise wasted fuel at 8c per thousand feet, the average cost of energy at the busses has been only 2.1 mills per kwh. This compares to 7 mills, the best quotation on purchased energy. How the amortization plan worked out is shown in the chart opposite.

In the face of steadily rising operating costs, many other producers may be figuring on generating their own power. Efficient, reliable Cooper-Bessemer gas engines are ideal for the job, enabling you to capitalize to the fullest extent on otherwise waste fuel. And they are fully convertible to Diesel, should that become desirable.

Write for the 12-page booklet "The Profitable Operation of an Oil Field Electric Plant." It gives the complete history of the Fittstown operation.

THE COOPER-BESSEMER CORPORATION
Mount Vernon, Ohio — Grove City, Pa.
New York Washington Bradford, Pa. Parkersburg, W. Va.
San Francisco, Cal. Seattle, Wash.
Houston, Dallas, Greggton, Pampa and Odessa, Texas
Tulsa Shreveport St. Louis Los Angeles



Gas Engines by

BUILDERS OF DEPENDABLE

Modern Engineering Methods Are Coping Effectively With Cumberland Problems

by Neil Williams

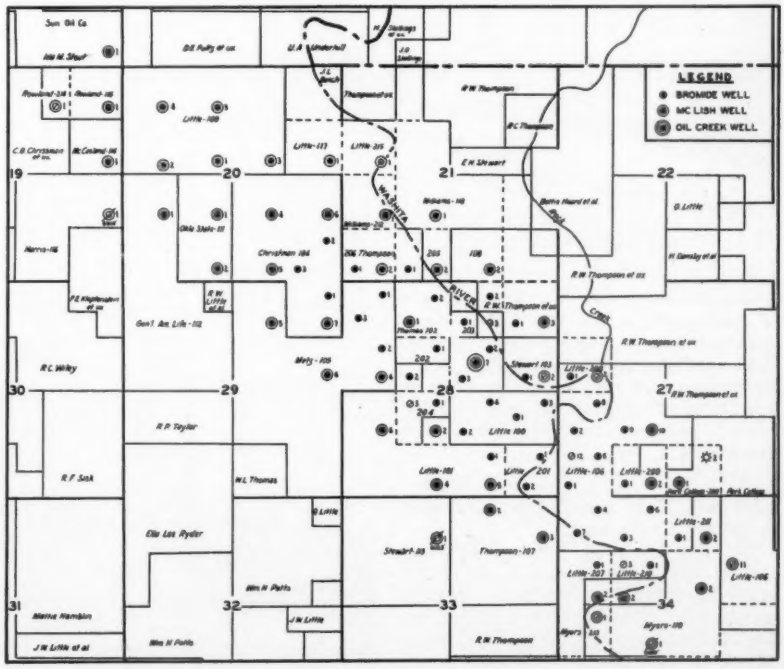
Oklahoma's most important discovery in recent years presented some unusual problems of development. Well-spacing complications, difficult drilling problems, and recurrent floods combined to tax the ingenuity of the operators and engineers. This article describes the measures that have been employed in working out solutions.

THE Cumberland field, located on the Mrashall and Bryan County line, ranks as one of the outstanding single petroleum reserves uncovered in Oklahoma in recent years. Owned and operated almost in its entirety by one company, its development has been carried out according to an orderly, conservative program without interference by competitive obligations. Production practices have been designed to attain the most effective utilization of reservoir energy to the end that the greatest possible recoveries can be expected.

Approximately 4 miles long and slightly less than a mile wide, the field, which is slightly less than 3½ years old, now embraces an area of from 2,200 to 2,300 acres. Production has been established in three sands, two of which have been fairly well developed while the third and deepest has just been opened, having one well. Additional potentially productive horizons have been logged in exploratory drilling. As of August 1, there were 77 wells with an accumulated production of approximately 7,500,000 bbl., obtained at greatly restricted rates of withdrawal. All wells, except one completed by Sun Oil Co. at the extreme north end of the field, are owned by The Pure Oil Co.

The structure is a mountain-type, anticlinal fold with a northwest southeast axis and having a 1,500-ft. closure. Rather steeply dipping limbs characterize the northeast side while the southwest side is somewhat flatter. The location is on the south flank of the Arbuckle Mountain uplift, on which the producing formations of the field either outcrop or are found near the surface short distances from the field.

Present producing formations are of Ordovician age and include the Bromide at approximately 4,800 to 5,200 ft.; the McLish at approximately 5,750 to 6,050 ft., and the Oil Creek, around 6,300 ft. Initial production and early development were in the Bromide, which is predominately sand with a productive thickness ranging up to 95 to 100 ft. Contrary to the general rule in Ordovician fields, the productive area of the deeper McLish sand is greater than that of the Bromide, which extends over approximately 1,000 acreas along the top of the structure. That of the McLish sand extends further down the flanks of the structure on all sides. In the one well which has been completed in it, the Oil Creek sand has a section of 100 ft. Location

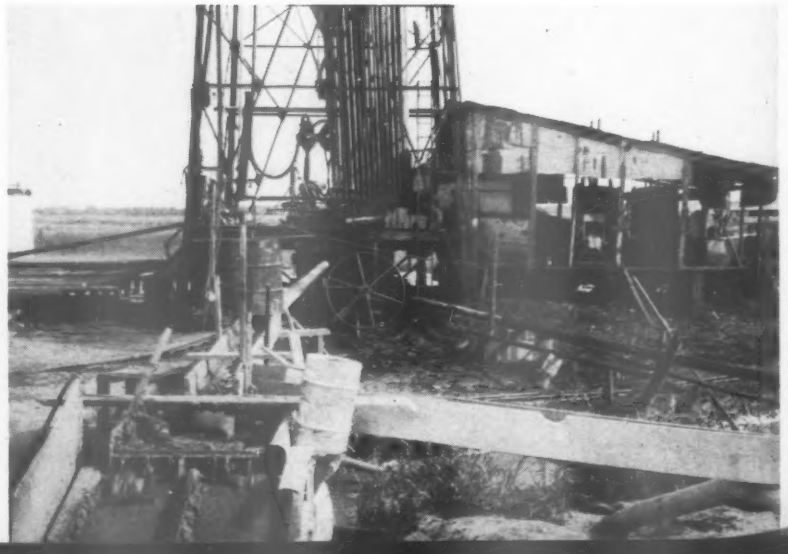


Map showing development of Bromide, McLish and Oil Creek sands

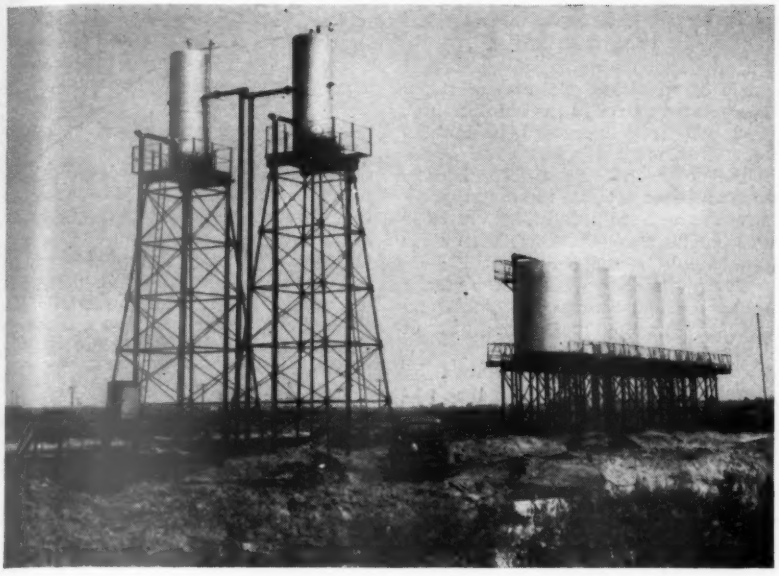
Pure Oil Co.'s camp in Cumberland field. District headquarters, warehouses and shops located on site to right

of this well is near the apex of the structure, and the productive area is not known. So far, of the 77 wells completed, 41 are in the Bromide sand and 35 in the McLish, and one in the Oil Creek sand.

On the basis of present spacing limitations, development in the Bromide and McLish sands is nearing conclusion. The spacing pattern for the Bromide sand, adopted shortly after the discovery well was completed in April, 1940, was designed for triangular 20-acre units with locations in the centers of the northeast and southwest 10 acres of square 40-acre tracts. This pattern prevailed until the issuance of Federal Conservation Order M-68, December, 1941, which prohibited the drilling of more than one well on 40 surface acres. The McLish sand, which has been developed since issuance of Order M-68, has been drilled entirely on the basis of one well to 40 acres. Locations for more McLish wells in most instances have been in the centers of the southeast 10 acres of their respecive 40-acre tracts. Later, when it is possible to do so, it is anticipated that additional McLish wells will be drilled in the centers of the northwest 10 acres of the respective 40-acre tracts, following an alternating 20-acre pattern similar to that adopted for the Bromide wells, but with the division of the 20-acre tracts reversed. Bromide wells drilled since Order M-68 went into effect generally have been located in the centers of the southwest 10 acres of the 40-acre tracts with a view toward filling in the undrilled centers of northeast 10 acres with additional Bromide wells when possible. Thus, when development ultimately is concluded there will be two Bromide and two McLish wells on each 40 acres within the Bromide producing area, the wells for the respective



Above: Discovery well (Pure Little 100 No. 1) Cumberland field. Wells since have discarded use of high concrete derrick corners. Right: Typical mechanical rotary rig employed in development of Cumberland field. Picture shows testing of recently completed discovery well of Oil Creek sand



Central separator and stock tank installation. Substructure places battery above flood waters of Washita River

sands being on alternate 10-acre units.

Oil Creek wells, following the spacing pattern initiated by the discovery well recently completed in this horizon, will probably be located in the centers of the northwest quarters of the 40-acre tracts.

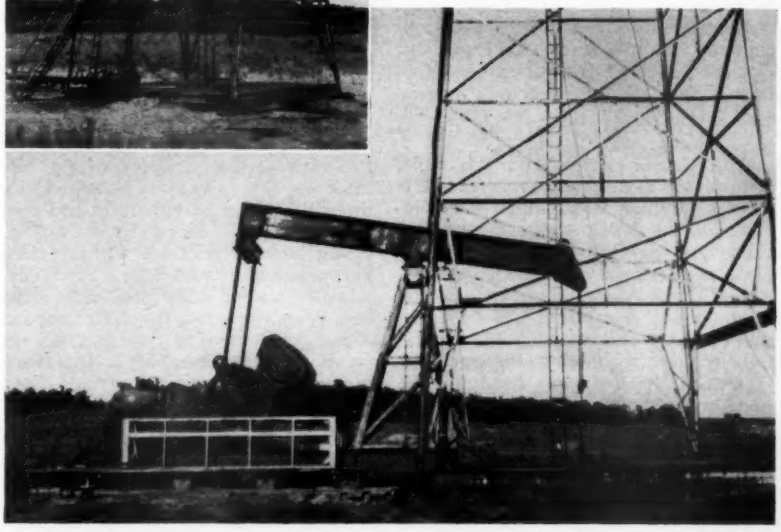
Additional productive possibilities lie in the Arbuckle lime, below the Oil Creek, to which one exploratory test, located on the flank of the structure, has been drilled. This well showed only some gas but indications were that the formation would carry oil at more favorable locations. Favorable quantities of gas also have been encountered in the Hunton lime of Silurian age above the present producing horizons, and in the still shallower Springer sand of the Pennsylvanian.

Location of a large part of the field within the level flood plain of the Washita River has presented a number of problems. The river follows a course roughly parallel to the axis of the structure bisecting the field lengthwise. During periods of high water, it inundates much of the field to depths of as much as 15 ft., and frequently shifts its course back and forth, cutting new channels and filling in the old. This not only has interfered with drilling and production operations at times by forcing shut-downs and endangering field installations, but also has necessitated elevation of lease stock tanks, separators and other such facilities on structures above the level of flood waters. Often much damage is done to lead and flow lines, and in one instance the shifting of the channel washed in a producing well.

Until recently, the operators also were faced with the outlook of having the major part of the field permanently inundated by the huge lake to be impounded behind the Red River dam now being completed at Denison, Tex., below the field. Backwater from the dam will extend up the Washita River beyond the field and were it not for a river diversion project recently undertaken the water would cover most of the field in places to depths up to 60 ft. or more. Before this project was decided upon, operators were confronted with having to raise all surface equipment above the new prospective water level, or, in the case of lease tanks, separators and other such facilities, move it to high land some distance away and relay and extend lines, all of which would entail a tremendous expenditure.

Instead, however, under the direction of the Denison District Army Engineers, a system of dams and dikes and new channels is being constructed beyond the upper end of the field by which the course of the river will be diverted around the field some distance to the east, and then back into the old channel at a point below the field. A range of hills which skirts the east side of the flood plain in which the field is located affords a natural barrier on that side. Another system of dikes below the field will prevent the impounding lake water from backing up into the field from that direction. By this, the river through the field will cease to exist, so that operations in the future also will be relieved of any danger or threat from the normal overflows that have occurred in the past.

Since completion in August, 1940, the first group of wells, consisting of



Pneumatic head pumping installation (left) and individual pumping unit (below) in Cumberland Field. Of 17 wells on artificial lift, three are pumped by former method and 14 by latter

four offsets to the discovery well, The Pure Oil Co. has kept eight drilling rigs running most of the time. Seven of these have been mechanical power rotary rigs operated by drilling contractors, including Loffland Bros., Olson Drilling Co., Carl Short and Noble Drilling Co. The other has been a company-owned steam rotary rig which was moved in from the company's Gulf Coast division. Engines of the power rigs, except those at outlying locations, have used natural gas as fuel, this being supplied by a field-wide distribution system.

The discovery well, located in the bottom land close to the river, was drilled with the derrick set up high on large concrete corner foundations. Since then, salvable wood mats have been used for bases, these are carried forward from well to well without great replacement of material. Cellars, constructed with collapsible forms, which also are salvable, are provided. Until recent months, these have been built with ready-mixed cement, but with this now unobtainable, the cement is mixed on location. As derricks are not left on the wells, only 12 have been required. These have been 122-ft. steel derricks, using standard 8-ft. steel substructures. Derricks and substructures are moved on.

Holes usually are started with approximately 90 ft. of 16-in. (o.d.) casing cemented to the top. For the surface string, approximately 800 to 900 ft. of 10¾-in. pipe is set and cemented with enough cement, usually from 500 to 550 sacks, to bring the cement behind the pipe up into the bottom of the cellar. This insures an adequate anchor for the string while drilling high pressure gas horizons below. Wells are completed to or through their respective producing sands either with 9-in. hole and 7-in. casing or with 8¾-in. hole and 5½-in. casing. Approximately 860 sacks of cement ordinarily are used in cementing this string, with special precautions being taken to insure a good cement job. In this, The Pure Oil Co. has followed the practice of rotating the pipe while cementing.

Well Time

Well time has run from 55 to 65 days on Bromide wells, from 75 to 80 days on McLish wells, and 100 to 115 days on Oil Creek wells.

Steeply dipping, hard formations have necessitated close watch on bit weights and rotary speeds to insure maintenance of straight holes. While the greatest chance of hole deflection occurs in starting through the Woodford chert, a very hard formation encountered around 3,300 ft., deviation is likely at most any place if proper precautions are not observed. Because of this, directional surveys are made at frequent intervals in all wells. Maximum deviation from vertical allowed is 5°, but with drilling technique used the holes are kept well within that limit.

Mud conditioning is an important phase of operation. Because of fairly high gas pressures in the Hunton lime, mud weight is increased to 11.3 lb. per gal. through this formation. Wells in the north end of the field also encounter some trouble with gas pressures in the Sycamore lime from 3,000 to 3,100 ft., through which formation mud weight is maintained at 10.4 lb. Both Aquagel and weighting material are used. Close control of weights and viscosity throughout the remainder of drilling is required.

Tops of sands are determined by samples and electrical logging. In completion of wells, cement plug is drilled out with 2½-in. tubing through which the wells are produced. Each of the reservoirs has a well-defined gas cap over the top of the structure and every effort is made to prevent its dissipation and to utilize its energy in preservation of bottom-hole pressure. So far only 17 wells have required artificial lift, these being downstructure wells in their respective horizons. Of these, 14 are equipped with individual pumping units, powered by gas engines, and three with pneumatic heads. Flowing wells are produced through tubing chokes and pinched to their percentage allowables. Gas-oil ratios average approximately 1,000 cu. ft. per bbl. Potentials of the wells average from about 1,000 to 1,500 bbl. per day flowing through tubing and 1-in. choke. The discovery well of the Bromide sand, however, flowed 4,520 bbl. in 24 hours through a 1-in. choke, while the discovery well of the McLish sand made 576 bbl. Oil is 36° A.P.I. gravity.

Production of each lease is handled through a central separator and stock tank installation. On leases subject to river overflows, the batteries are placed on steel substructures above high water level. Most of these structures, supported on concrete footings, have been constructed of salvaged 5½-in. perforated liner as legs, using old 2-in. tubing for bracking, as shown in an accompanying picture.

One of the chief problems is the deposition of paraffin in lead and flow lines. Removal of paraffin from high-pressure lines is accomplished by forcing pipe-line scrapers through the lines by line pressure. Low-pressure lines, including gravity lines and connections, are cleaned by means of steam heat. A portable 60-hp. boiler, permanently mounted on a low, four-wheeled trailer with pneumatic tires, has been provided for this purpose. Water production so far has not been an important item. It is indicated, however, that the reservoirs have water drives.

Pumping derricks are kept on pumping wells and other small-sized wells requiring frequent cleaning, shooting or other servicing. Two cable-tool remedial units and two other truck-mounted servicing units are operated in the field. A program involving the shooting of all wells not shot when completed is now being carried out. The wells are being shot with from 200 to 300 qt.

All separator vent gas is gathered and delivered to a gasoline plant, operated by Warren Petroleum Corp. Residue gas from the plant, except that returned for field fuel and camp needs is taken by Lone Star Gas Co. Oil is moved from the field through a 6-in. pipe line extending 58 miles over the Arbuckle Mountains to the Fitts field, where it connects with trunk lines. The crude-oil purchasing department of The Pure Oil Co. has a tank farm and pump station adjacent to the field on the west.

Fuel gas is distributed through a permanent system of lines connecting all wells and the camp. Because of the proximity of the river through the center of the field there has been no occasion for a general water system. Separate water lines have been laid to each drilling well with individual pumps placed at the river.

Features of Company Camp

The Pure Oil Co.'s camp and district operating headquarters are located on a large site on high ground immediately adjacent to the field. It contains an office and warehouse building, a motor transport shop and garage, boarding house, 43 completely modern company-owned residences for the operating personnel and other necessary buildings. An abundant supply of good water for the camp distribution system is supplied by a 500-ft. well. There is a modern sewage and adequate fire protection, and other modern utilities.

When the field was opened, only ordinary country dirt roads existed. Since then, both Bryan County and Marshall County have built new roads to the field from their respective county seats of Durant, 16 miles east, and Madill, 14 miles west. Both are well graded and graveled. These connect in the field, forming a single good road between those cities, passing the company camp and bisecting the field. The company has constructed a network of graded and oiled roads within the field connecting all wells and field installations.

The field is on a lease block of approximately 21,000 acres which The Pure Oil Co. acquired on the strength of a combination of surface studies and magnetic and seismograph surveys in the area. Drilling of the discovery well was started in December 1939 and completed in April 1940. First development was on the Marshall County side of the river, but soon spread to Bryan County. Operations are on the immediate supervision of John D. McNutt, division manager; with H. E. Schafer, division superintendent; W. M. Saxon, division engineer, and W. F. Schafer, district superintendent.

Correct Stabilizing Treatment Plus Tailored Control Eliminate Scale in Cooling Systems

by W. H. Thompson and J. W. Ryznar†*

SUMMARY

Laboratory experiments corroborated by field results indicate that the majority of cooling waters can be treated successfully for scale prevention by the use of a proper stabilizing treatment, particularly if a number of factors are controlled. The most important factors are:

1. Concentration ratio carried between makeup and circulating waters.

2. Dosage and type of stabilizing treatment used.

The concentration ratio that can be carried depends in turn on the pH of the circulating water, maximum temperature in the system and composition of the makeup water. An evaluation of these factors together with the concentration ratio desired indicates whether a supplementary pretreatment of the water is required.

THE recommendation for proper treatment of a cooling water is consideration and control of several factors to do a correct job of maintaining the system clean; however, the application of selected treatment and control is usually simple.

The most important factors to consider in recommending cooling-water treatment and control are:

(a) Concentration ratio as affected by composition of makeup water and quantity of makeup water used.

(b) Effectiveness of stabilizing chemicals.

(c) pH value of circulating water including effect of temperature, design of cooling tower and composition of makeup water.

(d) Temperatures in system.

(a) **Concentration ratio.** — A very important factor in scale prevention is the concentration ratio between the makeup and circulating water that is carried and that should be carried. Generally speaking, makeup waters of low hardness and alkalinity require fairly high concentration ratio for proper balance, and waters of high hardness and alkalinity require low concentration ratio in the circulating water for proper balance. This point of proper balance can be predetermined for any water and temperature from measurable constituents. The use of proper type and quantity of stabilizing treatment extends the range for scale and corrosion protection in the cooling-water system.

Estimation of the total quantity of makeup water required for various concentration ratios maintained in the circulating water plus that evaporated in the sprays is needed for calculating the size of softening-plant equipment for pretreatment of makeup water when necessary, for calculation of stabilizing treatment dosage, and for calculation of pump and pipe size for new installations.

The water vapor lost by evaporation and cooling in the sprays of from the surface of cooling ponds is essentially pure distilled water, leaving behind the dissolved salts, sludge, algae, etc. . . . Thus, this vapor loss has a concentrating action on the amount of solids in the circulating water. This vapor loss corresponds to the steam evaporated from a boiler.

The total volume of makeup water necsesary for any system is the sum of the amount of water vapor lost from the sprays in the pond or tower plus the water droplets lost in windage (inadvertent deconcentration) plus the intentional and controlled blowdown to keep the concentration ratio between the makeup and circulating water within definite predetermined limits.

We have found the following formula to give a close estimate of the total makeup water for a recirculating cooling system except at very low concentration ratio:

$$\text{Total quantity of makeup water, gallons per 24 hr.} = \frac{\text{Concentration ratio}}{\text{Concentration ratio—1}} \times \text{Evaporation loss in sprays, gallons per 24 hr.}$$

This relationship is shown graphically in Fig. 1.

The evaporation loss through the sprays is customarily estimated at 1 per cent of the water sprayed per each 10° F. temperature drop across the sprays, and in field work this figure is a good estimate for average calculations. It can be easily obtained on existing plants or those being designed. The concentration ratio actually being carried in existing plants is easily determined and in new installations can be calculated based on makeup water composition and plant data.

(b) **Effectiveness of stabilizing chemicals.**—Stabilizing chemicals are usually applied to the makeup water in small dosages which do not appreciably affect the chemical composition or analysis of the water. Each type of stabilizing chemical has its optimum dosage, above or below which increased scale will be obtained. Their action is entirely different from that of other treatment methods involving softening or acidification.

The mechanism by which these stabilizing treatments work has been described in some detail in a previous paper by the authors.[1]

Many compounds were found to be

(Continued on page 46)

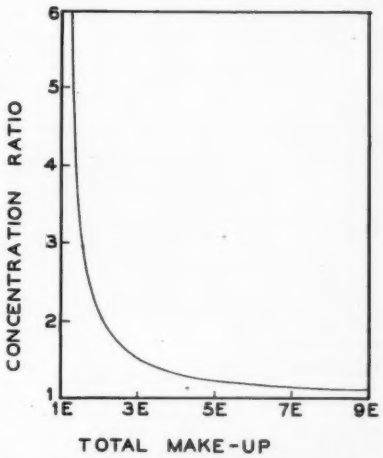


Fig. 1—Relationship between concentration ratio and total quantity of makeup water. "E" represents evaporation loss in sprays. 3E is equivalent to 3 times evaporation loss, etc

*Director of service, National Aluminate Corp. †Director of inorganic research, National Aluminate Corp.

For a Big Problem Facing ...

...SULLIVAN MOTORIZED CORE DRILLS

It has been said that one of the chief problems facing the petroleum industry is the uncovering of reserves to insure our present peak production. Sullivan Core Drills have helped to discover many of the world's present foremost producing properties and in the search for new favorable geological structures Sulli[illegible]

[illegible] Core Drills offer the maximum footage per day and lowest cost in any type of structure. Mobile, simple of operation, they and their [illegible] records are preferred by men who know.

SULLIVAN MACHINERY COMPANY, [illegible]ana. *In Canada:* Canadian Sullivan Machinery Company, Ltd., Dundas, Ont.

MODEL 37 . . . Up to 1200 feet

A light portable drilling rig for shot-hole drilling, shallow structure testing, and blast hole work. Equipped with hydraulic feeding mechanism for core testing and changeable to kelly drive for shot-hole drilling. Capacity 1200 feet of 2″ core or 850 feet of 6″ hole.

MODEL 300 . . . Up to 3500 feet

A heavy-weight, portable drilling rig for slim-hole production drilling. A younger brother to the large oil field rotaries; arranged for truck mounting to speed up moves between drilling locations. Operates same as conventional rotary plus added features which include hydraulic and make and break guns. Capacity 40,000 lb. drilling string.

STRINGALITE

PORTABLE SAFETY LIGHTING CABLE FOR DERRICKS

Made in 3 different types:

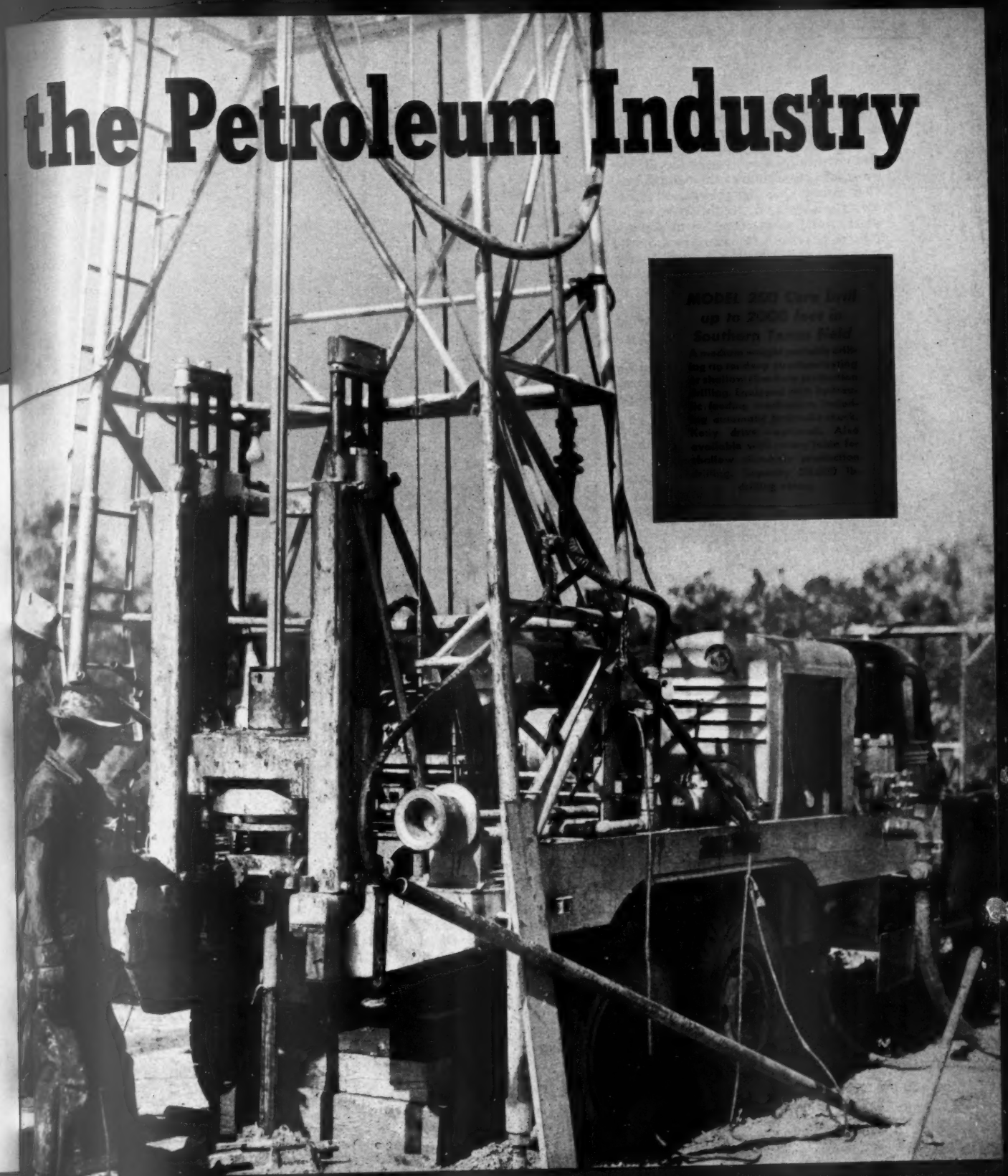
1. *Standard Stringalite, a sectionalized type which is assembled in sections.*
2. *Unimold Stringalite with all connections integrally molded.*
3. *Vapor-proof Stringalite, a unimold type with vapor-proof lamps.*

Sullivan PRODUCTS

[illegible]

Sullivan OFFICES

[illegible]


the Petroleum Industry
SULLIVAN

effective to some extent in stabilizing a water and in prevention of deposits, but some were much better than others. The molecularly dehydrated phosphates were found the most effective inorganic compounds. Compounds having pyrogallol structure and certain lignin derivatives were found most effective of organic materials tested. Combinations of the organic and inorganic treatments were found to be more effective than either used separately.

Fig. 2 and 3 show experimental laboratory equipment used in studying the effectiveness of stabilizing chemicals.

(c) **pH Value of the circulating water.**—The hydrogen ion concentration or pH value of the concentrated circulating water is a very important factor in prediction of results in any system and in the control required for scale and corrosion prevention. The pH value of recirculating water depends largely on the makeup water analysis, but to say that the circulating water has a pH value above 7.0 and is therefore noncorrosive or that it is above 8.1 and therefore is scale forming, is not true because it does not completely describe these conditions. The actual conditions governing thin protective film formation (corrosion prevention) or thick film formation (scale deposition) at any specific pH value in the circulating water are the combination of a number of factors such as calcium content, magnesium content, iron content, temperature, dissolved solids, etc.

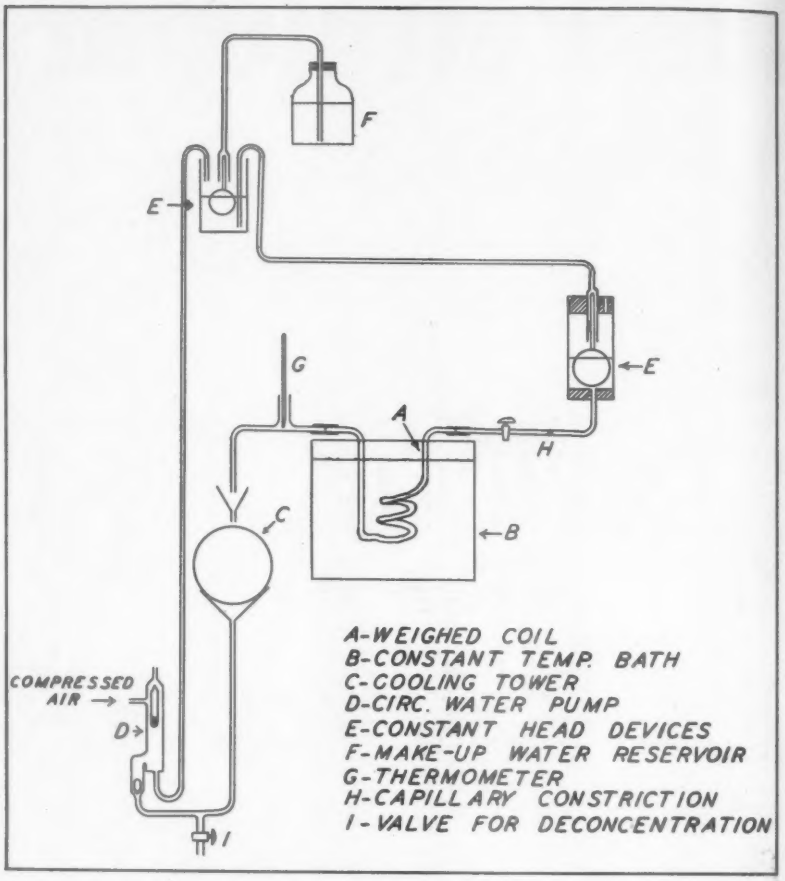


Fig. 2—Line drawing of laboratory testing equipment

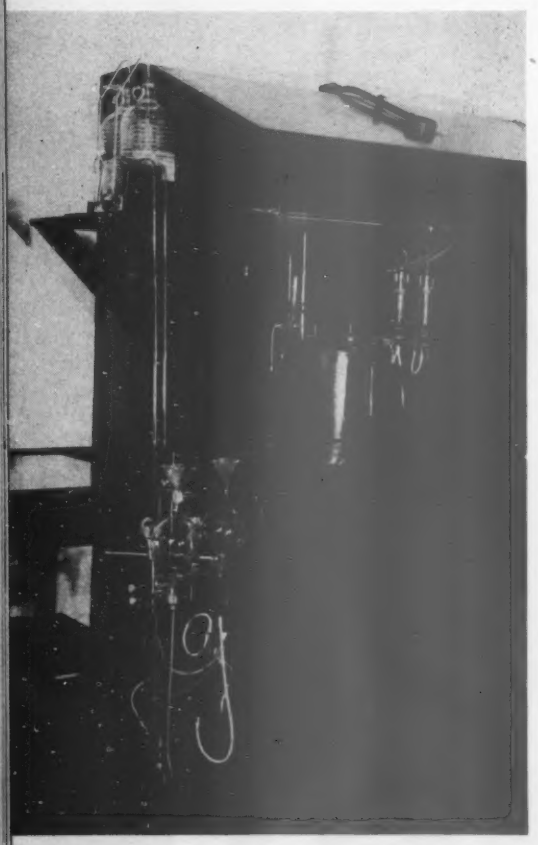


Fig. 3—Photograph of laboratory testing equipment

Efficiency of aeration will slightly alter the pH value of the circulating water. Some data along this line are given by Yoder[3]. The better the aeration, other conditions being equal, the higher the pH value of the circulating water. High temperatures and/or mechanical draft towers of modern design (Fig. 4) having the water broken into very thin films also produce pH values above the normal. Thus the type of plant equipment as well as the makeup water composition is an important factor to be considered in making recommendations for trouble-free operation.

The pH value of recirculating cooling water depends then on character or composition of makeup water, concentration ratio being carried and temperature and efficiency of aeration in the spray equipment. Therefore, pH is one of the important factors governing selection of proper combination of pretreatment and stabilizing treatment for any job.

(d) **Temperatures in the system.**—The temperatures encountered influence the rate of scaling or corrosive tendency in any system. High temperatures cause shifts in calcium carbonate equilibrium toward scale formation, or with a corrosive water the reaction rate is greatly accelerated.

When the above factors are considered it will be known whether stabilization treatment will give results desired or whether additional pretreatment, or auxiliary treatment of the makeup water is required.

1. Methods of Pretreatment

Where concentration ratios carried must be high due to water shortage, or if makeup water is of such composition that scale will be obtained at usual concentration ratios even with use of stabilizing treatment, proper pretreatment should accompany the stabilizing treatment.

The three general classifications of pretreatment of makeup water for cooling purposes are:

(a) The removal of objectionable solids by precipitation followed by settling and, if needed, filtration.

(b) By base exchange (zeolite) softening.

(c) By conversion of bicarbonates to sulfates by direct acidification.

(a) **Pretreatment by precipitation.**—

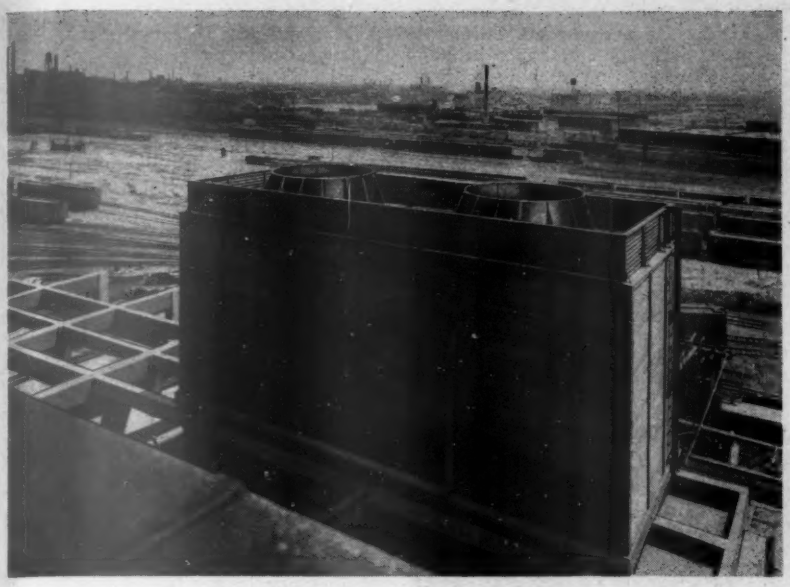


Fig. 4—Spray tower of modern design

Removal of objectionable solids in cold process by the use of regular standard equipment and chemicals such as lime, or lime and soda ash, plus a coagulant such as sodium aluminate has been common practice for many years. In the pretreatment for cooling use, the removal of calcium carbonate from the makeup water by precipitation with lime is usually all that is necessary. The use of both lime and soda ash on many types of waters will produce a more scaling condition in the circulatory system than lime only because of the higher pH value the circulating water develops when concentrated and aerated. This increased pH value and precipitation pressure is undesirable and should be avoided. A small amount of magnesium is usually also precipitated by the lime treatment[3] and while this is usually not needed it does no harm.

Necessity of Soda Ash

The use of soda ash with the lime in pretreatment is necessary only when the predicted calcium sulfate content of the circulating water, based on the concentration ratio to be carried and the makeup water composition, exceeds the solubility of calcium sulfate.

When using the precipitation type of pretreatment it is essential that the finished makeup water be clear and free from sludge or suspended solids, because in these plants the pH value of the circulating water is usually lower than the makeup water and any suspended calcium carbonate in the makeup water may form an adherent deposit, or many redissolve in the water and be reprecipitated as scale at the points of high heat transfer. It is also necessary that the optimum lime dose be used, as any excess will increase the calcium content and scale-forming tendency of the makeup and circulating water.

(b) **Pretreatment by base exchange.** The removal of objectionable solids in cold process by the base-exchange method has long been practiced. In the usual base-exchange softeners using sodium chloride as a regenerant, the calcium and magnesium of the water entering the mineral zeolite bed is exchanged for sodium and the effluent water contains sodium bicarbonate, sodium sulfate and sodium chloride in direct proportion to the amount of calcium and magnesium bicarbonate, sulfate and chloride present in the original water. The base-exchange materials used in this process are usually either synthetic inorganic or organic or processed natural greensand.

Generally speaking, the type of water produced by the base-exchange method of removing scale-forming salts using sodium chloride as a regenerant is only of moderately good quality for cooling-water makeup. It usually contains fairly large amounts of sodium bicarbonate, part of which concentrates in the circulating water and partially converts to normal sodium carbonate there. This causes high pH values, delignification of cooling-tower lumber under some conditions and excessively great scale tendency from any calcium and/or magnesium salts that may be in the system in small amounts due to leakage through the bed at the end of the softening cycle or from other sources.

In recent years the use of organic base-exchange materials has become quite common and by regenerating these materials with suitable mixtures of sulfuric acid and sodium chloride, predetermined for each water, the effluent water composition can be changed greatly from that obtained when sodium chloride only is used as a regenerant. The objectionable sodium bicarbonate content can be entirely removed or controlled at any predetermined level by this process.[4]

The effluent water produced from organic base-exchange materials regenerated with acid and salt is usually of very excellent quality for cooling-tower makeup as the total dissolved solids are at a minimum, total alkalinity is low and can be controlled at any point and scale-forming salts are absent except in the case of leakage through the bed at the end of the softening cycle. Should leakage occur the precipitation pressure in the circulating water is low and heavy scale would not be expected. The

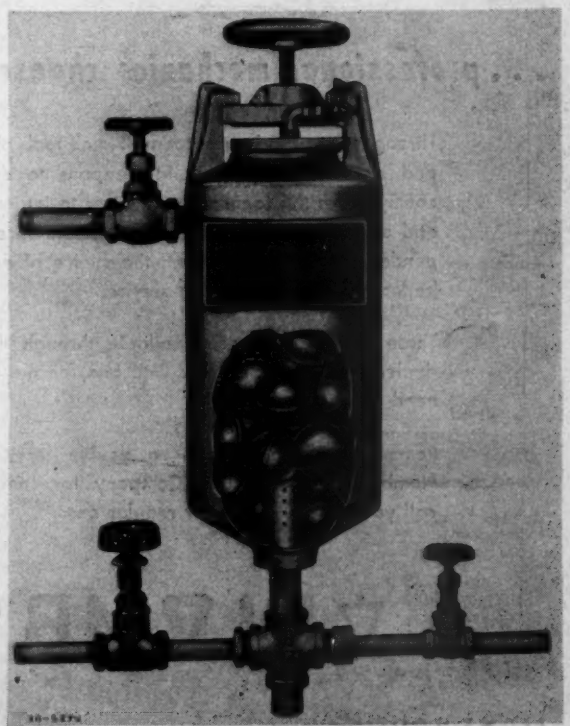


Fig. 5—Cutaway view of feeder

danger, of course, with with this type of water is in corrosion and in most cases auxiliary treatment with a corrosion-controlling chemical is recommended.

(c) **Pretreatment by acidification.**—This method involves the addition of acid, generally sulfuric acid, to decrease the alkalinity of the water. It has some merit on waters high in calcium or sodium bicarbonate, although with waters high in calcium care must be exercised that the concentration of calcium sulfate in the circulating water does not go above 90 grains per gallon. In some instances without stabilizing treatment calcium sulfate scale has been formed when a concentration of 70 grains per gallon has been exceeded. This scale is much more objectionable in some ways than calcium carbonate, inasmuch as it is harder and less easily removed. Stabilizing treatment has also been developed for prevention of calcium sulfate scale in cooling systems.

Ordinarily before much change in pH of the circulating water can be obtained with a corresponding decrease in precipitation pressure the titratable alkalinity to methyl orange in the makeup water has to be decreased to 4 grains per gallon or lower, depending on analysis of makeup water.

In many instances the amount of acid required to decrease the alkalinity sufficiently is so great that it is much more economical to pretreat the water by other methods to obtain the desired conditions.

There are also, of course, the hazards connected with the handling of sulfuric acid. The acid is very corrosive and it is self evident that very careful control must be exercised at all times or corrosion can become a much more serious problem than the scale was in the first place. Corrosion inhibitors are quite commonly used in conjunction with acid pretreatment because of the dangers of this method of scale prevention.

2. Auxiliary Treatment for Corrosion Prevention

In general two methods have been used in corrosion control:

(a) The use of chemical or mechanical deaeration has been tried in a few instances and has been reported to be very successful in eliminating corrosion conditions due to oxygen or other gases.[8]

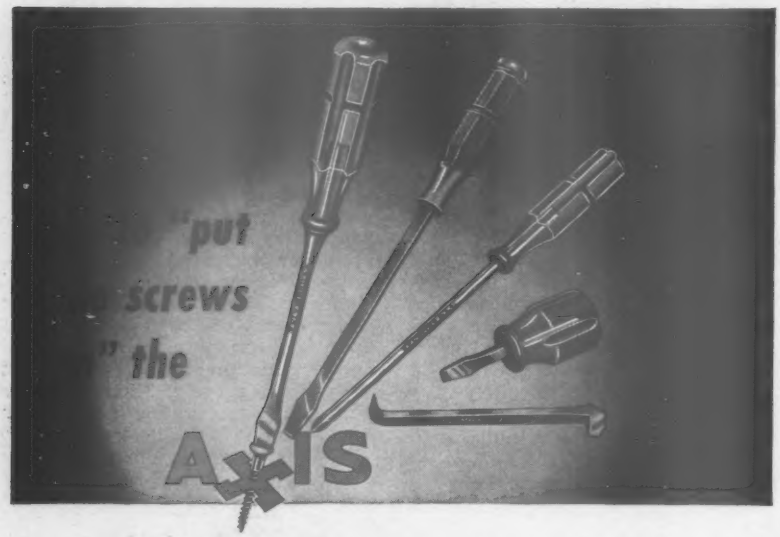
(b) The use of chemicals to produce an impervious film or stain on the surface of metal in contact with water is the more common method.

Chemicals such as chromates, silicates and phosphates are classified as anodic inhibitors and lime, soda ash, caustic soda and similar calcium carbonate film formers are classified as cathodic inhibitors. Of the first group the chromates have been found more uniformly successful. In this group it is important to have sufficient chemical present as low treatment dosage may give partial protection but at the same time accelerate local corrosion giving pitting conditions. Incomplete protection may be worse than general corrosion. Cathodic inhibitors or calcium carbonate film formers depend on proper balance of alkalinity, pH values and calcium content for maintenance of a protective film formation. These inhibitors are very effective when used with stabilizing treatment.

3. Direct Treatment with Stabilizing Chemicals

The use of stabilizing treatment does not require critical equipment and materials for application and control. Pretreating equipment other than for acidification is generally expensive and difficult to obtain at present, and even in normal times few plants can justify its large capital investment.

Varied types of stabilizing chemicals are necessary and available depending on composition of the makeup water and conditions in the water system. For instance, a different type of stabilizing chemical is needed for prevention of calcium sulfate than for calcium carbonate scale. Also when the makeup water is high in soluble iron still another type of sta-



. . . professional mechanics choose Plomb Tools

Throughout war industries today, Plomb tools of all kinds and sizes are helping build weapons to defeat the enemy. From the familiar screwdriver to intricate socket and attachment sets, outstanding performance and dependability have made them the choice of experts for better, safer, longer-lasting service.

These famous tools are available through the Plomb dealer in your community. Call him for the tools you need on your war job.

Remember Plomb performs a double service—consult Plomb Tools Contracting Company for special tools; call your Plomb dealer for regular ones.

PLOMB

PLOMB TOOL COMPANY LOS ANGELES CALIFORNIA

bilizing chemical is most effective. For calcium carbonate scale prevention varied combinations of organic and inorganic stabilizing chemicals are required in various ranges of hardness and temperature. An example to show the effectiveness of one type of stabilizing treatment is shown in the following analysis of a circulating water from a plant:

Analysis No. 38750—Results in Grains per U. S. Gallon	
Total dissolved solids	1909.5
Suspended solids	
Total hardness (as $CaCO_3$)	485.0
Calcium hardness (as $CaCO_3$)	205.0
Magnesium hardness (as $CaCO_3$)	280.0
Total alk. (MO) (as $CaCO_3$)	15.0
Free carbon dioxide (as $CaCO_3$)	6.5
Chlorides (as NaCl)	1340.0
Sulfates (as Na_2SO_4)	500.0
Silica (as SiO_2)	9.75
pH	7.5
Hypothetical Combinations	
Silica	9.75
Alumina	Neg.
Calcium carb.	15.00
Calcium sulfate	258.40
Magnesium sulfate	190.60
Magnesium chloride	116.20
Sodium chloride	1197.50

It shows 258.4 grains per gallon of calcium sulfate present in the water which far exceeds the theoretical solubility of approximately 100 grains per gallon.

The dosage required varies with makeup water composition and plant conditions but is usually between 0.25 and 1.0 grain per gallon. Cost of the treatment per thousand gallons of makeup water is low because of the small amounts of treatment required.

Application of stabilizing treatment is simple and requires very little attention. Chemicals are available in either pulverized or briquette form and are added either to the makeup water or to the circulating water. The briquettes are of uniform solubility and are especially easy to handle as no weighing or measuring devices are needed and the bypass feeder used (Fig. 5) is simple. The recommended rate of treatment can be easily maintained by adjustment of the needle valve controlling flow of water through the feeder.

When the makeup water composition is uniform the only control necessary is the determination of sodium chloride content of makeup and circulating water to obtain the concentration ratio existing on which to base blowdown requirements. When makeup water composition is varied, tests for pH values, hardness and total alkalinity of the circulating water may also be needed.

REFERENCES

1. W. H. Thompson and J. W. Ryznar, Combustion Vol. 14, No. 5, Nov. 1942.
2. J. D. Yoder, Power Vol. 86, No. 3, March 1942.
3. H. O. Hartung, Water Works and Sewerage, Vol. 88, No. 12, Dec. 1941.
4. F. K. Lindsay, Trans. Amer. Inst. Chemical Engineers, Vol. 37, No. 4, Aug. 1941.
5. E. G. Hammerschmidt, Petroleum Engineer, Vol. 12, No. 2, Nov. 1940.
6. W. H. Attwill, Refiner & Natural Gasoline Manufacturer 20, 122 (1941).

BOOK REVIEW

STUDIES IN ARC WELDING: DESIGN, MANUFACTURE AND CONSTRUCTION. First Edition. Published by James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. 1295 pp. $1.50.

This volume contains 98 outstanding papers on arc welding, submitted by trained technicians and engineers in the James F. Lincoln Arc Welding Foundation's 1940-42 industrial progress award program. It is the result of careful editing of papers on arc welding representing the work of 113 engineers, designers, works managers, superintendents, executives, foremen and other technicians, each of whom applied himself individually to a specific design study involving arc welding. The book will provide engineering, technical and trade schools with voluminous data which may be translated into new applications. The book contains 1,007 illustrations, the majority of which are actual photographs of welding procedures. The contents of the book are arranged in 9 sections with 98 chapters.

GATKE Brake Blocks Pay Double NOW!

The *Extra Performance Qualities* of GATKE Brake Blocks *are life savers* in these days of critical man power and material shortage.

The *great holding power* with *smooth, non-grabbing action* at all depths gets the job done *quicker* with reduced strain on men and equipment.

Long wear life with reduced flange wear facilitates *continuous* operation and *avoids maintenance.*

Avoid substitutes. Your Rig Manufacturers have GATKE Brake Lining that's engineered for the job.

GATKE Brake Blocks are made in many types to meet all service requirements of Oil Field Equipment.

Their Extra Performance Qualities result from nearly 30 years specialized development to meet changing requirements of Oil Field Service.

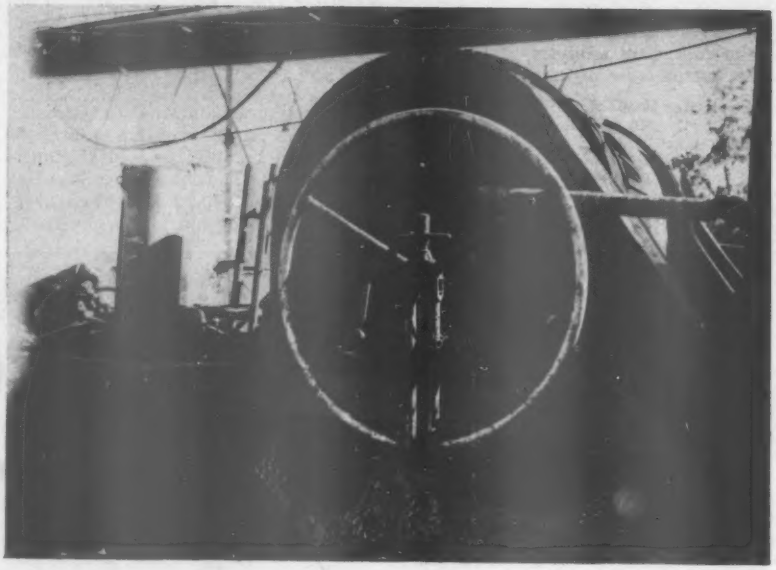
When your rig is GATKE-equipped, you have the best.

GATKE CORPORATION
228 N. LaSalle St. Chicago 1, Ill.

OPERATING IDEAS

Circular Rod Wrench Has Definite Advantages

A CIRCULAR rod wrench, sometimes called a wheel wrench, is becoming a standard part of the equipment of the rod and tubing truck. It is used whenever the rod string must be twisted considerably so that a great amount of energy is stored in it. When using straight wrenches there is danger of a man's losing his grip which will allow the twist to come out of the rod string and cause the wrench to spin violently. A number of workmen have been seriously injured by spinning wrenches. The grip for the rods fits in the slot in the wheel and is held in place by a hand screw; the small chain allows the gripping element to be slid in and out but prevents its being separated from the wheel. A piece of sucker rod attached to the hoist frame serves as a storage place for the wheel wrench while changing locations. Translated from the vertical position as shown to a horizontal one, the wrench would be ready to operate if the hanger was considered to be the rod string.



Adjustable Counterbalance On Stroke Post

THIS multiwell pumper was made from a heavy gear box, an internal-combustion engine and a stroke post equipped with a beam. The beam on the stroke post permits the ready counterbalancing of the pull on the gear box regardless of changes in the number of wells being pumped. The heavy weight on the top of the beam can be moved by a screw connected to the crank at the right end of the beam and locked in place at any point by the set screws in the side. This arrangement provides for quick adjustment and correct counterbalancing regardless of location of the wells.

Salvaged Hose Serves as Mud Line Shock Absorber

TO absorb much of the pulsation of the mud pump and prevent vibration from being transmitted to the standpipe and rotary hose, a contractor operating several strings of tools employs a short section of salvaged rotary hose which is inserted in the hydraulic line near the connection at the base of the derrick standpipe. Couplings are of a type that can be connected or disconnected quickly. As the hose is quite flexible, no appreciable time is consumed by measuring and cutting pipe as when stiff connections are used.

Cracking Technology—No. 3

Viscosity-Breaker Coil Operation

*by C. R. Wagner**

Recycle methods are the heart of commercial cracking process. The viscosity-breaker coil operation eliminates troubles caused by extremely heavy charge stocks, by producing lighter gas oils and separating them from the heavy residuals. Decomposition temperature is lowered as the "paraffinicity" of the charge is increased.

IN the operation of liquid-phase cracking units, where temperatures in the cracking zone were seldom over 850° F., two types of recycle stock had to be thrown into fuel oil or disposed of in other fashion than by return to the unit. The one type was a very high-boiling range, waxy material which had an A.P.I. gravity of 8° to 14° and which would produce a small amount of gas and a large amount of coke when cracked under the same conditions as those causing its formation. This was shown by producing recycle stock by coking a cracked fuel; this recycle was then cracked under the same conditions as the first cracking operation; the fuel from this operation was run to coke and the recycle recovered was again cracked. The amount of fuel produced in this operation was about twice the percentage produced in the first operation and, when the recycle from it was cracked, a small amount of dry gas and a larger amount of coke were formed. On distillation the fuel oil from this last run gave a waxy material of specific gravity greater than 1.0 which smelled strongly of aromatic compounds.

The other type of recycle which had to be disposed of was found in the light fractions and had a distillation range of about 400° to 475° F. Whether this cut by being subjected to the temperatures employed was molecularly rearranged, or that portion of the cracked product boiling in this range constituted the troublesome material, in any event this fraction did not crack well at any temperature below 850° F. As a result there would be an accumulation of this material which had to be worked off into some salable product, or else the recycle ratio on the cracking unit climbed to uneconomic figures. With the higher temperatures now employed this cut is one of the choice

*Consultant in refining technology.

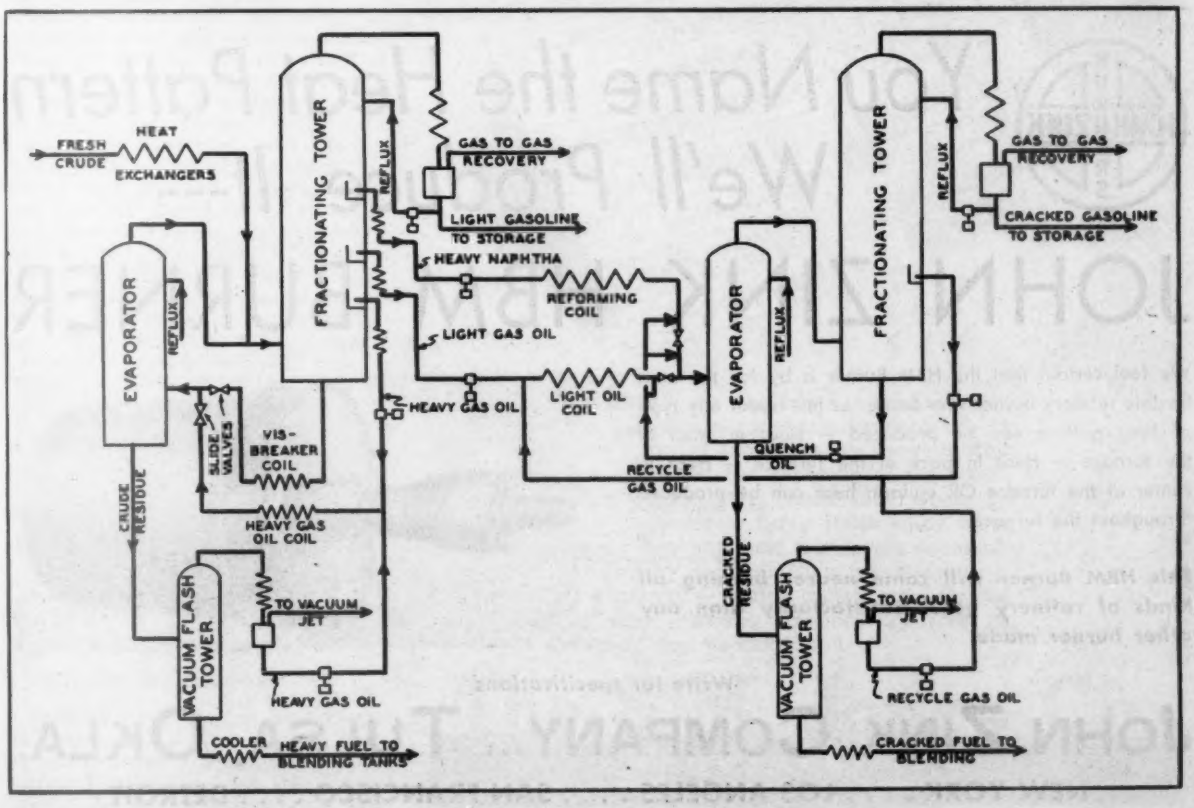


Fig. 1

cracking stocks available to the refiner.

The recycle stock that causes trouble now is the heavy part just lighter than fuel oil. From cracking operations above 1,000° F. some of this recycle may have a distillation range as low as 600° F. For any modern unit it is desirable to keep fuel oil produced by cracking gas oil and naphtha separate from fuel oil produced in the vis-breaker coil, although many combination units are operating with a common evaporator for all coils. The fuel oil produced from naphtha and gas oil is composed entirely of polymers whose carbon-hydrogen ratio is very high. The gravity of this fuel may run as low as 2° to 4° A.P.I. and that of the lightest 10 per cent cut may be as low as 10° A.P.I. Such charging stock will produce little gasoline, considerable gas and much coke. The fuel oil produced in the vis-breaker coil is relatively high in hydrogen content and the lightest 10 per cent may run as high as 16° A.P.I. and have a boiling point nearly 200° F. higher than the same gravity cut from the light oil tar. For this reason separate fuel flash towers should be used to control the stripping of recycle stock from these two types of fuel. A flow diagram of such an arrangement is shown in Fig. 1.

The object of the vis-breaker coil, of course, is not to make gasoline but to produce gas-oil fractions for cracking in the light-oil coil. The extremely high-boiling fractions of the crude, particularly petrolatum, are rather rich in hydrogen content and therefore contain a high potential percentage of gasoline. If an attempt is made to crack such products at a high enough temperature to produce a reasonable yield of gasoline of good quality, the asphaltic material also present will form coke and shut the unit down. By keeping a pressure of 200 to 500 lb. per sq. in. on the coil and a relatively high velocity through the tubes it is possible to crack such material at 890° to 915° F. without coke formation. Under such conditions less than 10 per cent of low-octane gasoline per pass is made and a good conversion of the residual material into gas oil is effected. The viscosity of the fuel oil left after stripping out the gas oil formed is much less than would have been the case had the same percentage fuel oil been produced by straight distillation. It is probable that more good con be done by effective research in this field than in any other operation in the modern refinery.

Many different figures have been given for the heat absorbed in the cracking reaction. They range from almost zero to over 1,000 B.t.u. per pound of gas and gasoline formed. Sachanen[11] gives a range of 360 to 1,800 B.t.u. per pound of gasoline for amounts of gasoline produced per pass varying from 30 down to 5 per cent respectively. Such variations are to be expected if the character of the reactions involved is studied. In visbreaking, for example, long molecules chiefly are split near the middle and only a minor quantity of gas and gasoline is produced. Secondary reactions are largely suppressed. The endothermic heat of reaction in vis-breaking is therefore very high when based on the pounds of gasoline produced.

In a low-pressure vapor-phase cracking coil operating at 1,050° to 1,100° F. where the crack per pass is in the range of 25 to 30 per cent the heat absorbed will also be high, although not so high as in the case of the vis-breaker operation. More secondary reactions are involved in this case, some of which are exothermic polymerization reactions. In a high-pressure light-oil coil operating at 975° to 1,000° F. the amount of heat absorbed during the cracking reaction may therefore be very small. This is particularly true if C_3 and C_4 hydrocarbons are being passed through the coil along with the light gas-oil charge. In such cases the effect of the exothermic reactions nearly balances the heat absorbed in splitting reactions.

The net heat absorption per pound of gasoline made will vary depending upon the character of the charge, the pressure in the cracking zone, the time of reaction and the temperature.

JOHN ZINK BURNERS

You Name the Heat Pattern
We'll Produce It---

JOHN ZINK HBM BURNER

We feel certain that the HBM Burner is by far the most flexible refinery burner ever made, as just about any type of heat pattern can be produced — Heat in front of the furnace — Heat in back of the furnace — Heat in center of the furnace OR uniform heat can be produced throughout the furnace.

This HBM Burner will come nearer burning all kinds of refinery gases satisfactorily than any other burner made.

Write for specifications

JOHN ZINK COMPANY... TULSA, OKLA.

NEW YORK . . . . LOS ANGELES . . . . SAN FRANCISCO . . . . DETROIT

If we assume for each of these variables that all other conditions are static, we find the following:

1. As the hydrogen content or paraffinicity of the charge is increased, the decomposition temperature is lowered. Therefore, decomposition, or crack per pass, will be more profound and secondary reactions will occur to a greater extent per pound of gasoline made from paraffinic material than from a charge deficient in hydrogen. Hence the heat absorbed will be less per pound of gasoline made from the more paraffinic material.

2. As the pressure upon the cracking zone is increased, polymerization reactions are favored. The pressure has no effect upon the cracking of the charging stock itself, although it has economic value in cutting down the size of the equipment required. The polymerization of the cracked products is exothermic in character and the heat liberated thereby tends to reduce the amount of outside heat needed for the cracking reaction. The application of pressure therefore reduces the net heat absorption per pound of gasoline made in the cracking zone.

3. The effect of time is to increase secondary reactions and crack per pass. Since many of these secondary reactions involve exothermic polymerization or rearrangement reactions, the net effect of increasing time is to reduce the endothermic heat of cracking when measured in terms of pounds of gasoline made.

4. As temperature is increased, crack per pass and secondary reactions will increase, the net effect of which will be to reduce the amount of heat required to produce a pound of gasoline by cracking.

For all of these conditions it is obvious that secondary reactions increase in a geometric ratio to crack per pass. It should be pointed out also that these generalizations may be modified or reversed if different viewpoints are taken. For example, the heat absorbed per pound of gas and gasoline made will not be identical with the heat absorbed per pound of gasoline made, and still greater variation would occur if we could calculate the heat absorbed per pound of charge cracked. Still other results might be obtained if we attempted to set values for a series of reactions in which the crack per pass was held constant.

Bibliography

17. Sachanen, A. N., "Conversion of Petroleum," p. 121, New York, Reinhold Publishing Co., 1940.

Pipe-Line Shipments Continue to Increase

Principal pipe lines of the country in the second quarter of 1943 continued the trends recently noted by showing increases over the year-earlier period in both volume and revenue. The percentage increase in volume continues larger than the percentage increase in revenue.

In the 3 months, April-June, 1943, leading pipe-line companies increased their total traffic 20 per cent over the same 1942 period, but drew from this traffic only 16 per cent increase over the revenue obtained in the 1942 period.

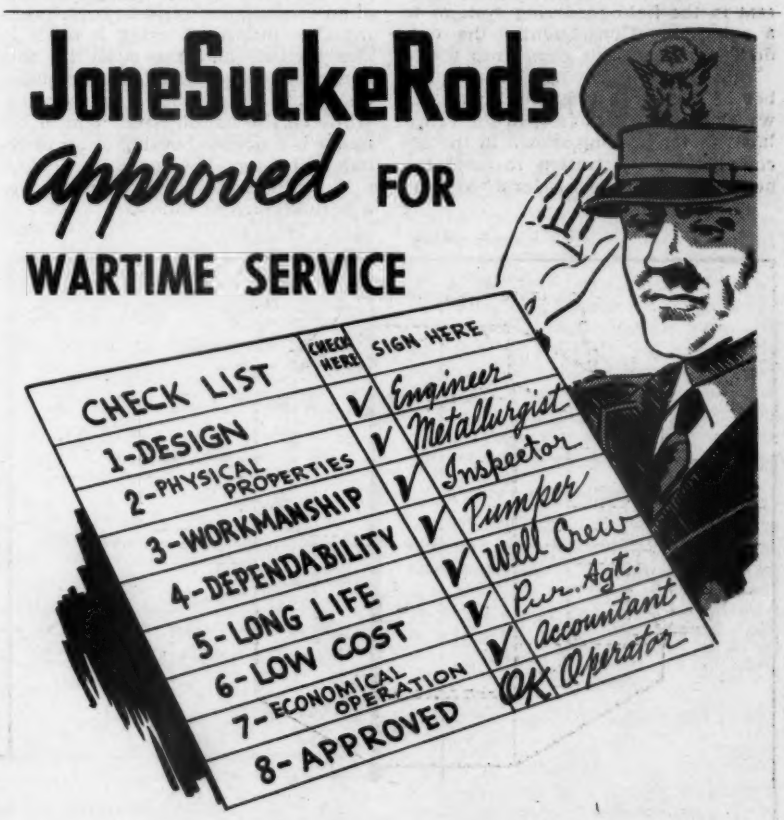
Shift in movement of petroleum increasingly to pipe lines as a war development is reflected in the increases.

Total volume of traffic handled by the lines in the 3-month period was 450,571,000 bbl. against 375,646,000 bbl. in the 1942 period and 419,343,000 bbl. in the first quarter of 1943.

Revenue totaled $62,383,000 against $53,788,000 bbl. in the 1942 period and $58,024,000 bbl. in the first quarter of 1943.

Leading carrier in the quarter in volume, Humble Pipe Line Co., also was among the largest in percentage of traffic gain. The company handled 41,131,000 bbl. in the second quarter against 28,876,000 bbl. in the 1942 quarter and 35,230,000 bbl. in the first quarter of 1943.

The leading gasoline carrier, Great Lakes Pipe Line Co., recorded a substantial increase in volume with 5,472,000 bbl. reported, an increase of 25 per cent over the 1942 quarter, but an increase of only about 2 per cent over the first quarter of 1943.



JoneSuckeRods are the ideal equipment for wartime operation — for maximum recovery at minimum cost. Oil producers, in keeping with both the spirit and the necessity of the times, are using carbon steel Jones rods wherever they can in order to have Jones alloy steel rods where they must and are getting economical, satisfactory service. They are effecting a double economy — saving critical steel for our fighting men — saving unnecessary loss of time, money and production.

The S. M. Jones Co.

○ JoneSuckeRods ○

General Office and Factory, Toledo, Ohio . . . . . Sales Office, McBirney Bldg., Tulsa, Okla.

Arc-Welded Housing for Open-Type Induction Motors

by C. W. Gladson*

The weatherproof motor housing was designed by J. R. Polston, designing draftsman, under direction of A M. Hill, maintenance superintendent, Stanolind Pipe Line Co. For his description of it, R. W. Gladson, welder, was awarded a prize by the James F. Lincoln Arc Welding Foundation. The designer is now making a new type of housing which will keep pump motors completely dry even though they are inundated under several feet of flood water.

REDUCED field gathering costs in the oil fields of the Southwest have made it necessary for pipe-line companies to reduce the investment cost in the field gathering systems to a minimum. Consequently the outdoor pumping unit came into use.

One company having a large number of open-type induction motors in warehouse stock, developed the ventilated motor housing shown in the accompanying illustration to meet the necessary requirements for a weatherproof housing with a minimum cost.

*Stanolind Pipe Line Co.

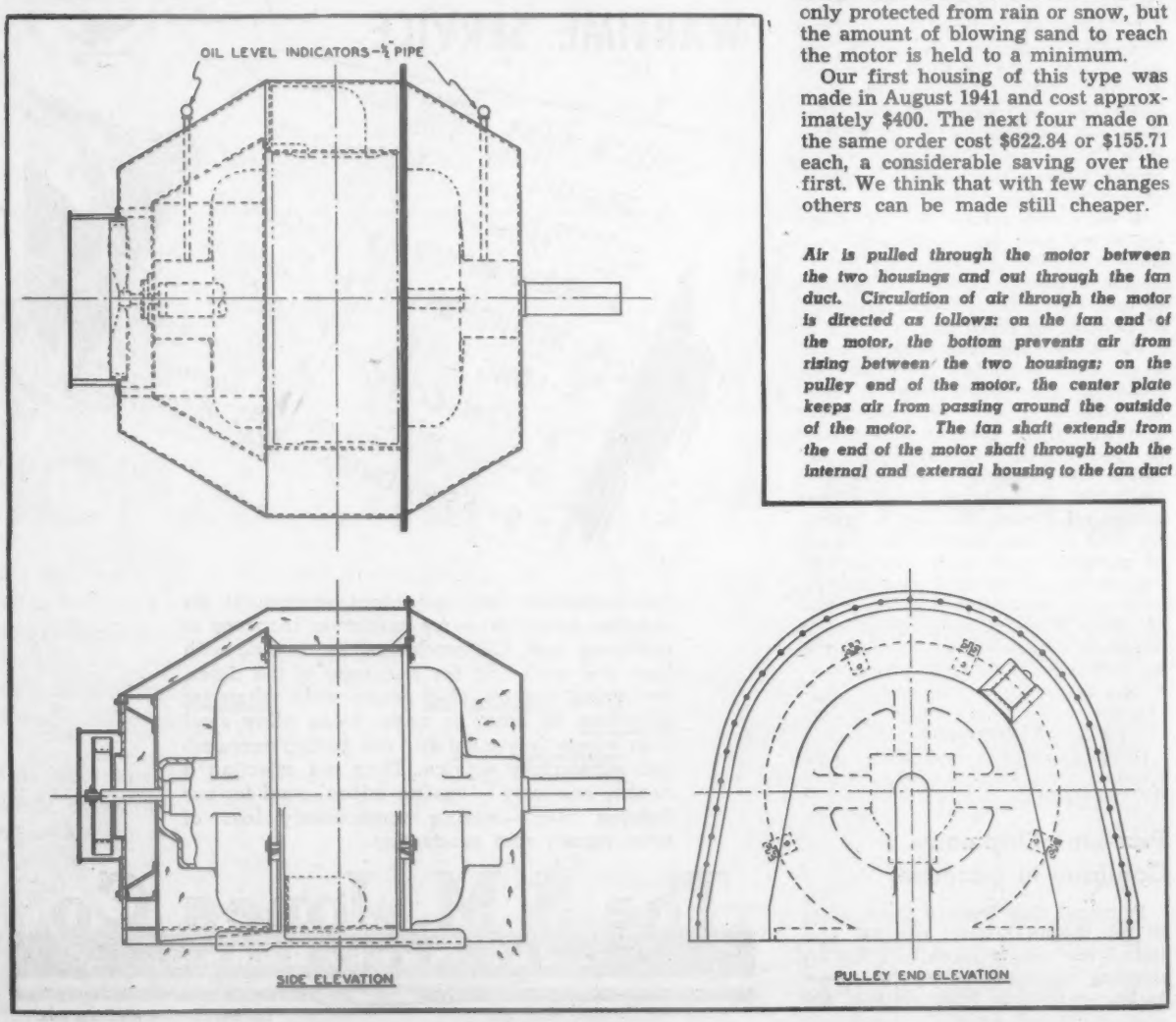
The weatherproof housing described in this paper is designed for a 75-hp., 900-r.p.m. motor. This design consists of an internal housing and outer housing. The internal housing is made in one section, and the outer housing is made in two sections. On the pulley end of the motor there is one housing, while on the fan or "stub" end of the motor is a double housing or an internal and outer housing.

The advantages of the housing over a building are as follows:

1. Lower costs.
2. Less space and material required.
3. Greater safety on account of less fire hazard.
4. More readily dismantled and cheaper to move and reerect.
5. Less weight—the housing weighs approximately 225 lb.

Our first housing has been in service 9 months. In that time there has not been a shutdown due to overheating the motor, or weather conditions—rain or snow. The motor is not only protected from rain or snow, but the amount of blowing sand to reach the motor is held to a minimum.

Our first housing of this type was made in August 1941 and cost approximately $400. The next four made on the same order cost $622.84 or $155.71 each, a considerable saving over the first. We think that with few changes others can be made still cheaper.



Air is pulled through the motor between the two housings and out through the fan duct. Circulation of air through the motor is directed as follows: on the fan end of the motor, the bottom prevents air from rising between the two housings; on the pulley end of the motor, the center plate keeps air from passing around the outside of the motor. The fan shaft extends from the end of the motor shaft through both the internal and external housing to the fan duct

Oil-Well Pumping Practices—No. 12

Effect of Presence of Gas on Performance of Sucker-Rod Pumps

by J. Zaba

Following a detailed discussion of the characteristics of sucker-rod pumping systems, this article takes up the matter of loss of efficiency due to the presence of gas and means of remedying this condition. The next installment of this series which began on July 1, will discuss the various types of sucker-rod pumps, namely tubing pumps, rod pumps and casing pumps.

PRESENCE in a sucker-rod pump of even a small amount of gas reduces sharply the volumetric efficiency of the pump. The effect of gas manifests itself, usually, by the so-called "pounding." With the gas present in the barrel, the traveling valve does not open until at some point of the downstroke when the pressure of the compressed gas finally equals the pressure of the fluid above the plunger. Dynamometer card taken for such conditions (Fig. 1) shows a sudden drop of load at some point of the downstroke.

Before discussing in more detail, the effect of the gas on the performance of the pump, it should be noted that pounding may be caused

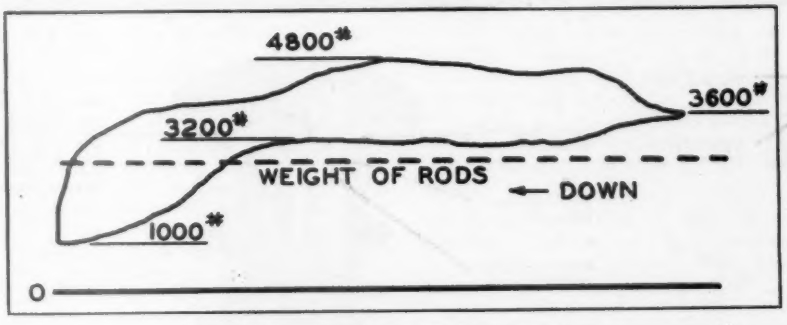


Fig. 1—Dynamometer card showing "pounding"

by factors other than the compression of gas in the pump barrel. If, for any reason, the displacement of a pump is larger than capacity of the well to supply fluid, then the barrel becomes only partially filled on the upstroke. Under such conditions the traveling valve does not open until the downward traveling plunger hits the fluid level in the barrel. At such a point there is a sudden release of load from sucker rods and the dynamometer cards for such conditions have appearance of pound as shown in Fig. 1. In other words from the dynamometer card alone it is very difficult to determine whether the cause of pounding is gas or lack of fluid. Pounding imposes very severe shock loads on equipment. Since procedure for elimination, or attempt on elimination, of effects of gas is different from that for elimination of effects of lack of fluid, it is important to be able to determine the actual cause of pounding. This can be done from the knowledge of operating characteristics of the well or from pump dynagraph cards or by determining the working fluid in the well. If the fluid level, as determined through direct measurements or from subsurface pressure measurements, is found to be giving the pump a satisfactory submergence, then the cause of pounding is probably gas. Once the cause is determined, proper remedial steps can be taken. In case of lack of fluid, reduction of pump displacement, by reduction of pump size or changes in pumping cycle, should bring the desired results. Correction of gas conditions is more difficult and in many cases the gas-pound conditions cannot be eliminated in their entirety.

The gas to be handled by the pump may be, from the standpoint of its origin, the free well gas or gas released from solution. The gas released from solution enters the pump dissolved in oil and is released from solution due to the pressure drop in the pump barrel. Regardless of its origin gas in the working barrel reduces sharply the volumetric efficiency of the pump because it occupies space in the barrel, thus reducing the fluid displacement and because it interferes with action of the valves.

May Affect Displacement

A very small amount of free gas handled may affect sharply the oil displacement.[1] To illustrate, assume that only 50 cu. ft. of free gas has to pass through pump for each barrel of oil, and that the submergence pressure is 10 lb. then

$$\frac{50}{5.6} \times 14.7 = V \times 24.7$$

where

V = volume of free gas, in barrels, under submergence pressure of 10 lb.

$$V = 5.3 \text{ bbl.}$$

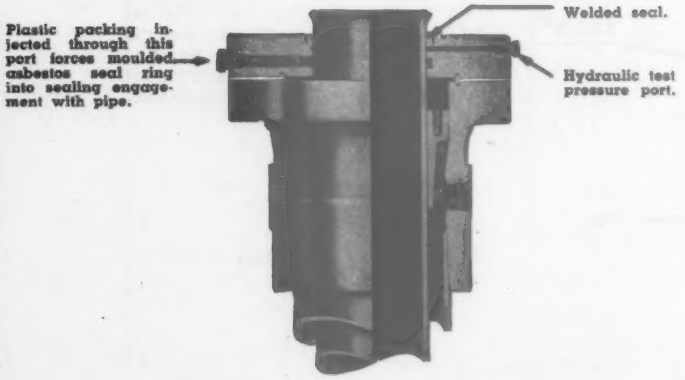
The displacement of the pump would be therefore 5.3 bbl. of gas for each barrel of oil. To handle 100 bbl. of oil per day the pump would actually have to displace 630 bbl. For certain given plunger size and length of stroke the speed of operations would have to be entirely too high, for the amount of fluid handled.

To discuss the effect of gas on valve action, assume a pump with 100 ft. of submergence and 1,000 ft. of fluid above the plunger, that is with submergence pressure of around 35 lb. and pressure on top of plunger of around 350 lb. At the beginning of the downstroke the barrel is filled

A CASING JOB IS ONLY AS SAFE AS ITS SURFACE SEAL—

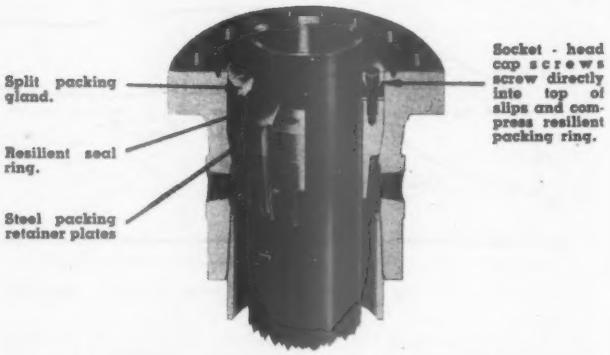
CAMERON
CASING HEADS

PROVIDE TWO PROVEN METHODS OF PREVENTING PRESSURE EQUALIZATION BETWEEN CASING STRINGS


Plastic packing injected through this port forces moulded asbestos seal ring into sealing engagement with pipe.
Welded seal.
Hydraulic test pressure port.

CAMERON TYPE "M" TEST-WELD SEAL

If the chemical and physical properties of the casing are conducive to practical field welding, the Cameron Type "M" Test-Weld Seal may be employed with complete satisfaction. Unlike any other casing head with a weld-testing feature, the Cameron Type "M" Test-Weld Flange utilizes a welding flange in which a test seal is effected below the welded seal by the injection of a special plastic packing through a port in the flange. This plastic packing flows around the outside of a moulded asbestos ring which is recessed in the bore of the flange, forcing the moulded ring into sealing engagement with the casing. Hydraulic test pressure is applied between the welded seal and the test seal through still another port in the flange. The test seal in itself provides an efficient casing seal and may be repacked at any time subsequent to completion without disturbing the well head assembly by simply injecting more plastic packing.


Split packing gland.
Resilient seal ring.
Steel packing retainer plates
Socket - head cap screws screw directly into top of slips and compress resilient packing ring.

CAMERON TYPE "W" RESILIENT SEAL

Where hard-to-weld Grade N-80 casing is used, or, if for any reason a welded seal is not desired, the Cameron Type "W" Resilient Seal is recommended to provide a safe seal between casing strings. When casing is suspended on the slips and cut off, an oil, gas and heat resisting synthetic rubber ring and packing gland are laced over the casing and bolted down on top of the slips. Tightening the socket-head cap screws applies compression to the resilient packing to effect a pressure-tight seal. Steel packing retainer plates, moulded in the bottom of the resilient seal ring, bridge the slip segments and thus confine the packing to the area between the top of the slips and the packing gland. This design eliminates exposed threads on the inside diameter of the casing head and permits higher compression in the packing than do conventional screw type packing glands.

If desired, a Type "WM" Test Flange, similar to the Type "M" Test-Weld Flange illustrated at left, can be furnished to provide means for testing the resilient Type "W" seal.

CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. *California:* The Howard Supply Co., Los Angeles.
Rocky Mountain: Mountain Sales & Service, Casper, Wyoming.

ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS CERTIFIED

with both, fluid and gas. With standing valve open this gas is under submergence pressure of 35 lb. When the plunger starts its downward action, the traveling valve is still closed and remains so to a certain point of the downstroke when the gas has been compressed to the pressure of 350 lb. When the end of the downstroke is reached there is then in the clearance space, that is the space between the standing and traveling valves at the end of the downstroke, the gas compressed to the pressure of 350 lb. When the plunger starts its upstroke, the expansion of free gas, if any, and release of gas from solution take place. Since, at constant temperature, the product of pressure and volume of a gas is constant, the volume of gas must expand 10 times before the pressure drops to 35 lb., the submergence pressure, and permits the standing valve to open. The later in the upstroke this occurs the less opportunity will the pump barrel have to fill with fluid. Conditions easily can occur when combination of pressures, size of clearance space, amounts of gas and stroke of plunger is such that the volume created by the upstroke is not sufficient to permit the gas in the barrel to expand to the submergence pressure. In such a case the standing valve would be still closed at the end of the upstroke and no fluid would enter. On the downstroke the gas in the pump would be compressed and the traveling valve would not open. The pump would be gas-locked, with gas being compressed and expanded between the valves and with no fluid delivered.

The effect of gas in reducing the volumetric efficiency of a pump is serious in any well and in deep wells it is the main cause of efficiency reduction. Remedial measures are available but in many cases reduction of the unfavorable effect of gas is very difficult.[2,3,4,5] Essentially it does not make any difference whether the gas entered the pump as a free or as a dissolved gas. Since, however, the free gas can be, in most instances, kept out of the pump, the remedial measures for free and dissolved gas have to be discussed separately.

Remedying effects of free gas.—The free gas causes particular difficulties in wells which just ceased to flow and have been put to pumping. The attempt to keep the gas out of the pump must use the only satisfactory, under conditions, principle of separation of oil and gas, that is, the separation by the difference of gravities. If given opportunity, through slow downward flow of oil, the gas will escape through oil into the annular space between tubing and casing. Such an opportunity is provided by use of gas anchors. The most generally used gas anchor consists of a length of tubing screwed to the bottom of the working barrel and closed at the bottom by a bull plug. Inside of this pipe is pipe of small diameter extending downward from the standing valve. The oil enters the annulus of the gas anchor through holes in the top of the outside pipe. During the downward flow of oil, gas separates from oil and escapes through the upper openings of the outside pipe into the space between the casing and tubing and the oil enters the pump through the inside pipe of the anchor. To perform efficiently, a gas anchor must meet certain conditions. The annulus must be sufficiently large to permit slow downward flow of oil. The velocity of this flow should be below the rate of rise of gas bubbles in oil which is assumed to be around 6 in. per second.[1] To assure slow entrance of oil into the anchor and to provide vent holes for escape of gas, large number of holes with combined area of at least four times the area of standing valve, should be available. The diameter of the inside pipe should not be too small, to minimize the coming out of solution of dissolved gas in oil entering the pump.

In certain cases other means may be resorted to promote separation of oil and gas such as shooting the well to make a cavity around the pump, or placing the pump in a hole below the producing horizon in an especially drilled sump hole. This last method would not be, of course, applicable under sand trouble conditions. Maintenance of minimum pressure on casinghead permits escape of gas into the casing and prevents the lowering of fluid level below the tubing perforations. Formulas have been worked out to determine the correct minimum amount of gas which has to be bled off, in case of wells pumping only few hours a day, in order to prevent gas-lock because of the lowering of fluid level.[6]

Remedying effects of gas out of solution.—Gas coming out of solution is the principal cause of difficulties encountered in handling the gas through the pump: A bottom-hole separator is now available[7] which, through mechanical agitation, causes at least some of the gas to come out of solution before oil enters the pump. The separator is a gas anchor with "agitators" mounted on springs on the outside of the suction pipe. Vibration and movement of tubing is utilized to impart vibrating motions to the agitators. Oil passing downward through the annulus, as in a gas anchor, is subjected to the churning action of the agitators, which action is conducive to the liberation of some of the dissolved gas from the solution.

Principal means of combating the effects of the dissolved gas is proper design of pump and adjustments in characteristics of the pumping cycle. As far as design of the pump is concerned it should be noted that any sucker-rod pump is, to a certain extent, a compressor. The clearance space, therefore, and the length of the stroke are the factors which affect the compression ratio of the pump. The smaller the clearance space the less fluid and gas will be left between the valves at the end of the downstroke. Less expansion will be needed during the upstroke to bring the gas pressure down to the submergence pressure and the standing valve will open earlier in the upstroke. On the downstroke smaller clearance permits higher compression of the gas in the barrel, a condition needed for the opening of the traveling valve. In actual practice decrease of clearance is attained by placing the traveling valve in the bottom of the plunger and by proper spacing of the plunger. This places the traveling and standing valves close together at the end of the downstroke, reducing the clearance space. Another factor in design of the pump, which has important effect on the dissolved gas is the size and design of the standing valve. Rapid and turbulent flow contributes toward coming out of solution of the dissolved gas. To prevent this the standing valve should be large and streamlined so that the flow of the fluid entering the barrel is slow and smooth. In wells experiencing gas difficulties the oversized standing valve has proved definitely its value.

As far as characteristics of the pumping cycle are concerned long stroke has the same effect as reducing the clearance space. The clearance space becomes a smaller portion of the stroke. Better compression of the gas on the downstroke is made possible. Slow speed of pumping gives the barrel more time to fill and reduces the speed of entrance of the fluid into the pump. As already pointed out, this has a beneficial effect on decreased evolving of gas from solution. On the other hand, temporary increase of pumping speed may break gas-lock because the resulting overtravel of plunger increases the plunger stroke. Speed of pumping, however, has to be always considered from the standpoint of installation as a whole.

BIBLIOGRAPHY

1. Bruce H. Robinson: "Economics of Pumping," A.P.I. Drilling and Production Practice, 1935, p. 91.

2. T. P. Sanders: "Recognizing and Overcoming Gas Lock in Pumping Wells," The Oil and Gas Journal, June 20, 1940, p. 43.

3. Huston Hoffman: "Don't Let Gas Lock Rob Your Pumps," Oil Weekly, Oct. 23, 1939, p. 22.

4. S. M. Stearns: "Factors Affecting Volumetric Efficiency of Sucker Rod Pumps," The Oil and Gas Journal, June 11, 1942, p. 41.

5. Frank Briggs: "Modern Well Studies," Oil Weekly, Nov. 21, 1940.

6. R. H. McLemore: "Bleed-off Arrangement Permitting Slow Rate of Release Proves Best for Gas Lock Conditions in Pumping Wells," Oil Weekly, Nov. 29, 1937, p. 17.

7. H. Lee Flood: "Bottom-Hole Agitation Removes Solution Gas From Fluid in Pumping Wells," Petroleum Engineer, Nov., 1939.

THE DOUBLE ECONOMY OF

AND

RINK THREAD

STEPS IN TOOL JOINT REPLACEMENT

Making longitudinal cuts 180° apart with acetylene equipment.

Wedging of two halves.

Gauging "Cold Position" of the cold tool joint for reference mark.

Gauging pipe for "Hot Position." This is done by placing one end of template at the "Cold Position" mark of the tool joint and marking the circumferential advance to "Hot Position."

Loading or unloading the portable furnace with lifter and tool joint elevator.

Workman applying hot tool joint. Gauging position mark on the tool joint advances to the "Hot Position" mark on pipe.

SPANG *Shrink Thread* DRILL PIPE

NATIONAL *Shrink Thread* TOOL JOINTS

1. ***ELIMINATES*** last engaged thread failures through the use of broad flat-profile threads.

2. ***ELIMINATES*** leakage and wash-outs through pipe threads by patented taper seal between drill pipe and tool joints.

3. ***ELIMINATES*** creepage during drilling and galling of threads during application by the shrinking on process.

4. ***REDUCES*** Tool Joint renewing costs. No bucking-on machine is required for renewal—no rethreading of pipe—or re-chasing of threads is necessary—and there is no heavy trucking expense involved.

★ ★ ★

With Spang Shrink Thread Drill Pipe and National Shrink Thread Tool Joints, the renewal job is done on the job — right at the well — Double Economy.

SPANG-CHALFANT

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Pittsburgh, Pa.; Los Angeles, San Francisco, Calif.; Tulsa, Oklahoma; Dallas, Houston, Texas. Export: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2.

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Stack and Chimney Design

We are having trouble with too little stack draft. Can you suggest what may be wrong?—G. D. F.

Additional information is needed to determine just what the trouble is, but from your location in a high altitude, it would seem logical that your stack is failing to function because of the high altitude. This topic will be discussed here, along with other factors that are involved in the design of stacks.

Static Draft—The draft or suction produced by a stack or chimney is usually about all that textbooks discuss. The static draft is the suction produced by the stack when there is no movement of the gases in the stack. Obviously, this is a theoretical case because the gases must move or rise if the stack is to serve its purpose. As movement occurs, part of the draft is used up as friction against the sides of the stack and hence a smaller draft is produced than that indicated by the static draft.

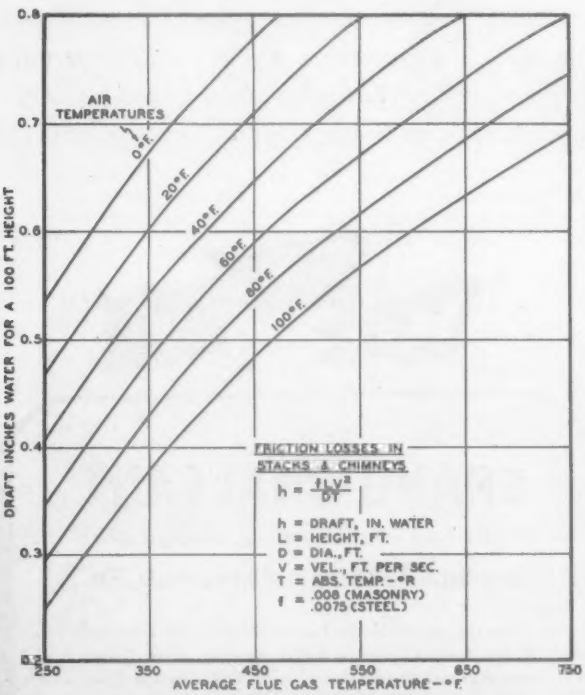
The theory underlying static draft can be easily derived and hence the static draft is presented here as a set of curves of the draft created by a 100-ft. stack plotted against average gas temperature and for a series of air temperatures as in Fig. 1. Thus, a 100-ft. stack operating with gases at 600°F. (in at 650-out at 550) at a maximum air temperature of 100°F. and at normal barometric pressure (or altitude) will produce a static draft of about 0.6 in. of water. For nearly all furnaces a draft of 0.6 in. is satisfactory, but if a 0.5-in. draft is adequate, the height could be 5/6 or 100 or only 83 ft.

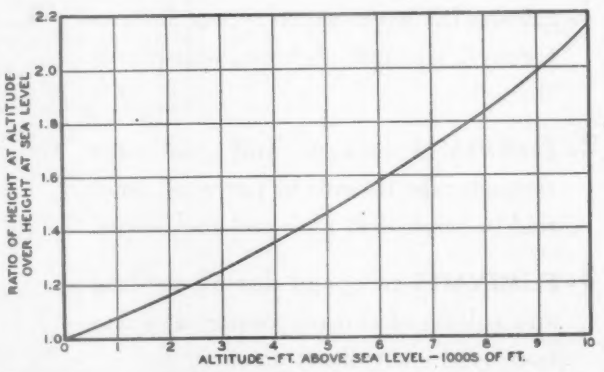
Effect of Altitude—The effect of altitude (or lower barometric pressure) is to reduce the draft that a stack can produce. More specifically, the lower barometric pressure reduces the weight of the gas and the weight of the air by the same proportion, which in turn, reduces the draft (difference in weight of gas and air column) by the same proportion. The effect of altitude is indicated in Fig. 2 by means of a multiplier correction factor as a function of altitude (Cotton, June 1923 issue of Buildings). This correction factor is the ratio of the height required at the new altitude as compared with the height at sea level.

Thus, the 83-ft. stack (or chimney) discussed above, under the topic of static draft, would need to be lengthened to $1.4 \times 83 = 116$ ft. if it were to operate at an elevation (altitude) of 4,500 ft. above sea level.

Friction Loss—Although the friction loss in stacks or chimneys is very small, the draft that is produced is also small, and hence, friction loss becomes an important factor. The general formula for fric-

(Continued on Page 65)





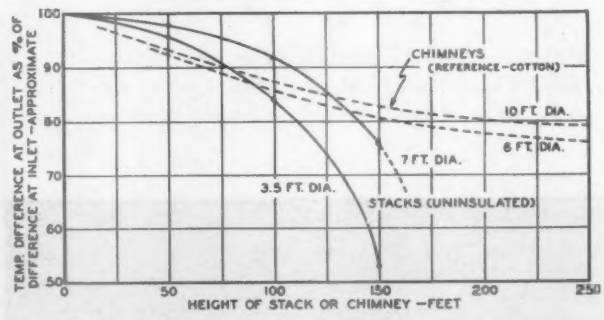


Fig. 1 (left)—Static or theoretical draft in a 100-ft. stack or chimney at or near sea level. Fig. 2 (right, top)—Effect of altitude. Fig. 3 (right, bottom)—Approximate loss in gas temperature in stacks in 25-mile wind and at conventional flue-gas velocities

ABSTRACTS

of technical papers presented before the American Chemical Society, Petroleum Division, Pittsburgh, Pa., September 6-10

Method for Determining the Activity of Cracking Catalysts

CHARLES L. THOMAS, GUSTAV EGLOFF, and JAMES HOEKSTRA, Universal Oil Products Co, Research Laboratories, and WILBUR C. SHAND, Blow Knox Co., Baton Rouge, La.

A 25-cc. sample of the catalyst is placed in a special reactor tube and a gas-oil fraction passed over the catalyst at the rate of 100 cc. per hour for 2 hours at 500° C. The gas is collected and the weight determined. The liquid product is distilled to remove the gasoline and the weight of gasoline determined. The yield of gas plus gasoline as weight per cent of the charge is used as a measure of the activity of the catalyst. A sample of standard catalyst is employed to define an activity curve which is used for evaluating the activity of catalysts in terms of the standard catalyst.

An Automatic Distillation Apparatus For Gasoline Analysis

LESTER STEFFENS and DONALD P. HEATH, Technical Service Division, General Laboratories, Socony-Vacuum Oil Co., Inc.

PRECISE distillation is one of the major tools available for gasoline analysis, but operation at the necessary high reflux ratios results in a time requirement of as long as several weeks for distillation of a single sample. To expedite such work, an automatic distillate collector was constructed for use with a Podbielniak Super-Cal distilling apparatus, to permit continuous operation with a minimum of attention from the operator. Successive distillate fractions are measured in a float chamber and emptied automatically into bottles. The boiling point of the distillate is recorded continuously. The apparatus can be operated for a 16-hour period without attention from the operator.

Sulfuric Acid Extraction in Hydrocarbon-Type Analysis

C. C. ALLEN and H. W. Duckwall, Anderson-Prichard Research Laboratory, Cyril, Okla.

SULFURIC acid absorption experiments were carried out on a paraffin-naphthene-kerosene fraction containing known proportions of various benzene and naphthalene derivatives. It was found that employing several different ratios of 101 per cent acid to oil and extrapolating to zero acid to oil ratio, the complications due to incomplete removal of unsaturates, solubility of saturates in the extract, and attack of the acid on the saturates could be avoided. The data obtained on hydrocarbon mixtures and the saturated sulfuric acid raffinates by the extrapolation method could be combined to give information on the unsaturated constituents.

Liquid Densities of Volatile Hydrocarbon Mixtures

G. H. HANSON, Phillips Petroleum Co., and R. D. KUIST and G. G. BROWN, University of Michigan.

THE use of apparent densities for methane and ethane in the liquid phase, suggested by Standing and Katz for estimating the density of crude oil saturated with natural gas at high pressure, has been extended to liquid mixtures of volatile hydrocarbons as found in natural gasoline. The results agree with the experimental data in a satisfactory manner. At the present time this appears to be the most reliable method for estimating the density of liquid petroleum and natural gas mixtures from the composition of the mixture.

Thermal Properties of Hydrocarbons

J. F. FALLON and K. M. WATSON, University of Wisconsin, Madison, Wis.

NEW generalized correlations have been developed for the heat capacities of the ideal vapors, the heat capacities of the liquids, and heats of vaporization of hydrocarbons and petroleum fractions. It has been attempted to make these correlations consistent with recently developed heat capacity values for vapors derived from spectroscopic measurements as well as the calorimetrically observed data on petroleum fractions. In addition, it was attempted to make the three correlations thermodynamically consistent with each other.

For the specific heats of the ideal vapors of hydrocarbons containing more than four carbon atoms the following equation is recommended for the range of 0° to 1,400° F.:

$$C_p = (0.0450K - 0.233) + (0.044 + 0.0177K) \times 10^{-4}t - 0.1530 \times 10^{-4}t^2$$ where

C_p = specific heat
K = U.O.P. characterization factor
t = temperature, °F.

Equations are presented for the lighter paraffin and olefin gases in two forms:

For temperatures from —300° to +200° F.

$$c_p = 7.95 + u\,T^n$$

For temperatures from 0° to 1,400° F.

$$c_p = a + bT + cT^2$$

where

c_p = molal heat capacity
T = temperature, °Rankine

Values for the constants of these two equations are tabulated for paraffins and olefins of four carbon atoms or less.

The specific heats of liquid petroleum fractions are represented by the following equation from 0° F. to a reduced temperature of 0.85.

$$C_p = [(0.355 + 0.128 \times 10^{-3}\,°\text{A.P.I.}) + (0.0503 + 0.117 \times 10^{-3}\,°\text{A.P.I.}) \times 10^{-4}t]\,(0.05K + 0.41)$$

Heats of vaporization at atmospheric pressure were calculated from the Clapeyron equation using the vapor pressure equation of Gamson and Watson. These values are presented as functions of boiling point and molecular weight and A.P.I. gravity in a graphical correlation.

Enthalpies calculated from combinations of these correlations are in good agreement with experimentally observed data on petroleum fractions. The heat capacities are in general somewhat lower and the heats of vaporization higher than those of the general correlation presented by Watson and Nelson [Ind. Eng. Chem., 25, 880 (1933)]. The new correlations are in better agreement with recent data and more nearly approximate thermodynamic consistency.

Vapor Pressures of Organic Compounds

B. W. GAMSON, Great Lakes Carbon Corp., Morton Grove, Ill., and K. M. WATSON, University of Wisconsin, Madison, Wis.

It has been found that the vapor pressures of all of over 40 organic compounds investigated may be represented over wide ranges of temperatures by the following equation:

$$\log p = \frac{A}{T_N} + B - e^{-50\,(T_N - b)^2}$$

Deviations of experimental data from this equation are generally less than 2 per cent for pressures ranging from the critical down to 0.1 mm. of Hg.

The constant b is found to increase

progressively as the number of carbon atoms in a homologous series is increased and has been evaluated as a function of number of carbon atoms for the paraffins. For other series of compounds

$$b = b' + \Delta b$$

where b' is the constant of the paraffin of the same number of carbon atoms and Δb is a constant characteristic of the series which has been evaluated for 14 series of compounds.

The constants A and B are readily evaluated from the boiling point and critical point after b is established. Critical temperatures in turn are satisfactorily estimated from boiling points by published methods. Critical pressures may be estimated by the following equation:

$$p_c = p_c' + \frac{\Delta p}{n_c + c}$$

where p_c is the critical pressure of a compound containing n_c carbon atoms, p_c' is the critical pressure of the paraffin of the same number of carbon atoms, and Δp and c are constants characteristic of the homologous series. A plot of p_c' as a function of n_c has been developed and the constants Δp and c are evaluated for 14 series of compounds.

By these methods it is possible to estimate a complete vapor pressure curve for any member of the 15 series investigated from a knowledge of only the boiling point.

THE "WHY—WHEN—WHERE" OF RECAPPING AND REPAIRING!

WHY? **It's absolutely vital to America's war effort!** The more rubber we save HERE, the more we can give our fighting men—OVER THERE!

It's economical! A quality recapping job costs **only about one-third** of the expense of a new tire—yet gives **50% of new tire mileage!** That's a REAL SAVING from the "dollars-and-cents" angle!

It's good business! Protect your continued business operation during this rubber crisis—have your tires recapped or repaired before it is too late!

WHEN? When the tread on your present tires has worn too thin for proper traction—that's the time to act! Don't wait until the rubber has worn through to the fabric—your tire will be weakened **beyond repair.** Have your tires inspected NOW!—and regularly from now on!

WHERE? Your recapping and repairing should be done by a Certified Master Treader who offers you this scientific program:

- Efficient and proper service to all customers.
- Proper maintenance of equipment and tools.
- Best utilization of materials.
- Recapping of only recappable tires.
- Repairing of only repairable tires.
- Striving for top-quality workmanship.
- Operation of shops at maximum capacity.

◆ ◆ ◆

The sole purpose of the present National Recapping and Repairing Program—officially approved by the Office of Rubber Director, War Production Board—is to keep essential commercial and industrial transportation in operation.

Tom P. McDermott, Inc., has placed all its facilities and equipment wholeheartedly behind this vital program—and offers 24 to 36 HOUR INDUSTRIAL AND OIL COUNTRY SERVICE to motor-carrier operators in Kansas, Oklahoma, Texas, Arkansas and Louisiana. As Certified Master Recappers and O.P.A. Approved Tire Inspectors, we stand ready to cooperate in this all-out effort TO CONSERVE RUBBER.

Tom P. McDermott, Inc.

Mid-Continent Area Headquarters for Recapping and Repairing

Phone 3-9188 **Tulsa 5, Oklahoma** **L.D. 414**

Potentiometric Determination of Acidity in Highly Colored Materials. Application to New and Used Petroleum Lubricants Containing Additives

LOUIS LYKKEN, P. PORTER, H. D. RULIFFSON, and F. D. TUEMMLER, Shell Development Co., Emeryville, Calif.

POTENTIOMETRIC methods applicable to the determination of free and combined acidity of materials soluble only in a nonaqueous solvent are presented; the methods are particularly applicable where acidimetric color titration indicators fail, that is, to highly colored or opaque materials such as used lubricants or lubricants containing oxidation and corrosion inhibitors, detergents, fats, and other additives. Although the methods were developed primarily for use in the study of the oxidation characteristics of lubricating oils, the principles, apparatus, and procedures are applicable to a large variety of other materials such as asphalt, emulsions, resins, polymers, animal and vegetable fats, oils, etc.

Titration is made directly or after saponification with potassium hydroxide in a single-phase solution of the sample in a nonaqueous solvent (benzene-isopropyl alcohol) containing approximately 0.5 per cent water, using a glass-calomel electrode system. Inflection points and fixed cell potentials are used for the estimation of end points. The determination by a single titration of two or more components of a mixture of acids of bases not distinguishable in an aqueous titration, and phenomena which make possible the estimation of ionization constants of acids and bases having limited solubility in water are briefly described.

The Permeability of Hydrocarbon Gases Through Rubber Tubing

J. R. RILEY, M. J. STROSS and H. M. EBY, Universal Oil Products Co. Laboratories, Riverside, Ill.

HYDROCARBON gas permeation for planar films of rubber varies inversely with thickness of the film and directly with the area. Likewise, permeation of gases through rubber tubing varies directly with the inside diameter, and inversely with the wall thickness.

For a single type of rubber tubing, the permeability of different gases varies over a wide range. In general, olefins permeate rubber more rapidly than paraffins; hydrocarbons of the C_4 range much more rapidly than those of lower molecular weight.

Synthetic rubbers, e.g., neoprene and particularly Koroseal, are far less permeable than any compounds of natural rubber tubings. Plastic tub-

ings such as Resistoflex are much superior than either synthetic or natural rubber. Synthetics of the buna and butyl type were not investigated.

Questions on Technology

(Continued from Page 62)

tion loss is—

$$h = \frac{f L V^2}{D T}$$

in which

h = draft loss, in. water
L = height, ft.
D = diameter, ft.
V = velocity, ft. per sec.
T = absolute temp., °F. plus 460
f = factor, masonry is 0.008
factor, steel is 0.0075

Thus, for an 83-ft. steel stack 3 ft. in diameter, operating at 600°F. 1060° absolute), and at a velocity of 50 ft. per sec., the friction loss is—

$$h = \frac{.0075 \times 83 \times 50 \times 50}{3 \times 1060} = 0.5 \text{ in. wtr.}$$

The exceedingly small diameter and very high velocity of this illustration were purposely selected to make a large friction loss. In fact, the loss is just large enough to completely stop the operation of the 83-ft. stack discussed in each of the above topics. In other words, the friction is so large that the static draft is exactly counterbalanced and the stack would produce exactly no draft at all.

Obviously, a larger diameter (lower velocity) stack must be employed. Thus, a 5 ft. diameter stack would result in a velocity of 18 ft. per sec. (rather than 50) and the friction loss would then be—

$$h = \frac{.0075 \times 83 \times 18 \times 18}{5 \times 1060} = 0.038 \text{ in. wtr.}$$

This is an altogether satisfactory friction loss—and the 83-ft. stack discussed before, having a static draft of 0.5 in., would actually produce 0.5 — 0.038 or 0.462 in. of draft when a 5-ft. stack is employed.

Effect of Heat Losses.—Perhaps the most difficult or least understood factor is the loss of temperature which the gases undergo as they rise through the stack or chimney. Difficulty arises because of the heat loss is dependent upon nearly all other factors, such as velocity, capacity, inlet temperature, wind velocity, etc. For a particular velocity the situation can be analyzed into a somewhat simple relationship, such as the one shown in Fig. 3. This figure is based on somewhat high velocities (about 30 ft. per sec. for a 50-ft. stack, 15 ft. for a 100-ft. stack and 8 ft. for a 150-ft stack.) At lower velocities, the loss in temperature is much greater and perhaps this explains the great temperature loss shown by Cotton in his June 1923 article in the magazine Buildings. His suggestions are shown in Fig. 3 as dotted lines.

One situation is clear, i.e., chimneys, because of the insulating effect of the thick walls, do not suffer much temperature loss, particularly at customary flue gas velocities. At very low velocities, some temperature loss may occur.

Fig. 3 shows the ratio (as percentage) of outlet to inlet temperature difference (between gas and air) for various heights of stack or chimney. Thus, an uninsulated 100-ft. stack operating at a velocity of about 15 ft. per sec. in a 25-min. per hour wind, and at an air temperature of 80°F., would have a ratio of temperatures of about 84 per cent—so that if the inlet temperature were 650°F. the outlet temperature would be 0.84 (650 — 80) + 80 = 558°F.

Space does not permit a complete example of the design of a stack—but such a design would involve a trial-and-error computation which would involve all of the above factors at the same time.

SAVE ON SALT WATER DISPOSAL with J-M TRANSITE PIPE

On lead lines, as well, this modern asbestos-cement pipe provides these important advantages:

HANDLING COSTS REDUCED by the long lengths and light weight of Transite Pipe.
SPEEDY INSTALLATION assured because Transite Pipe is easy to handle . . . easily assembled by an amazingly simple joint-ing method. Readily re-located, too.
MAINTENANCE MINIMIZED by Transite's tough, corrosion-resistant, asbestos-cement composition.
For details, write for Catalog DS-320, Johns-Manville, 22 East 40th St., New York, N. Y.

JM Johns-Manville
TRANSITE PRESSURE PIPE
For salt water disposal systems and for lead lines

LANE-WELLS
PENETRATION

PROVES IT on THE TOUGHEST JOBS!

"GET THE GUN THAT GETS RESULTS"

Tomorrow's Tools-Today!

LANE WELLS COMPANY

24 HOUR SERVICE — 30 BRANCHES

CALCULATING WATER PRODUCTION FROM DECLINE CURVES

AN economic consideration of the factors determining expense and profit to be made on those wells which produce large amounts of water should include information as to the amount of water which will be produced. Wells of this type often produce huge quantities of salt water and the expense incurred in disposing of this water, as well as increased lifting costs, is an important factor in determining the ultimate profit to be made.

Estimating the amount of water which a well will produce before depletion, is often difficult because the water production is usually dependent upon individual well conditions. Two wells in the same locality, producing from the same formation and recovering the same amounts of oil, do not necessarily produce the same amounts of water.

The accuracy with which future water production can be estimated depends upon the trend of the individual well-decline curve (per cent oil vs. cumulative oil). The trend of these decline curves follows two general patterns, a straight line on cartesian coordinate or a straight line on semilogarithmic graph paper. Calculation of water production for decline curves of the first type was discussed in a previous article. (See The Oil and Gas Journal, Sept. 2, 1943.)

Decline curves of the second type (semilog paper) often deviate from straight-line plots; however, during the later life of the well when the large amount of water production becomes an important item, the trend usually flattens out into a straight-line relationship.

Calculating Water Production

An ideal decline curve which plots as a straight line on semilogarithmic paper is shown in Fig. 1. The equation of this curve is:

$$y = Ce^{-kx}$$

where:

- y = fraction of oil in total fluid (per cent oil ÷ 100)
- C = value of "y" when "x" = 0
- x = cumulative oil after first water encroachment
- e = base of natural logarithms = 2.7183
- $k = 2.303 \dfrac{(\log_{10} y_2 - \log_{10} y_1)}{x_2 - x_1}$, where x_1 y_1 and x_2 y_2 are any two points on the straight line

The total amount of water produced for any period covered by the curve is:

$$W = \left(\frac{e^{kr} - e^{ks}}{Ck}\right) - (r - s)$$

where:

- r = cumulative oil production at the end of the period
- s = cumulative oil production at the beginning of the period

The value (e^{kr}) can be calculated by noting that (e^{kr}) is equal to the number whose logarithm to the base 10 is (0.4343 kr).

Example of Calculations

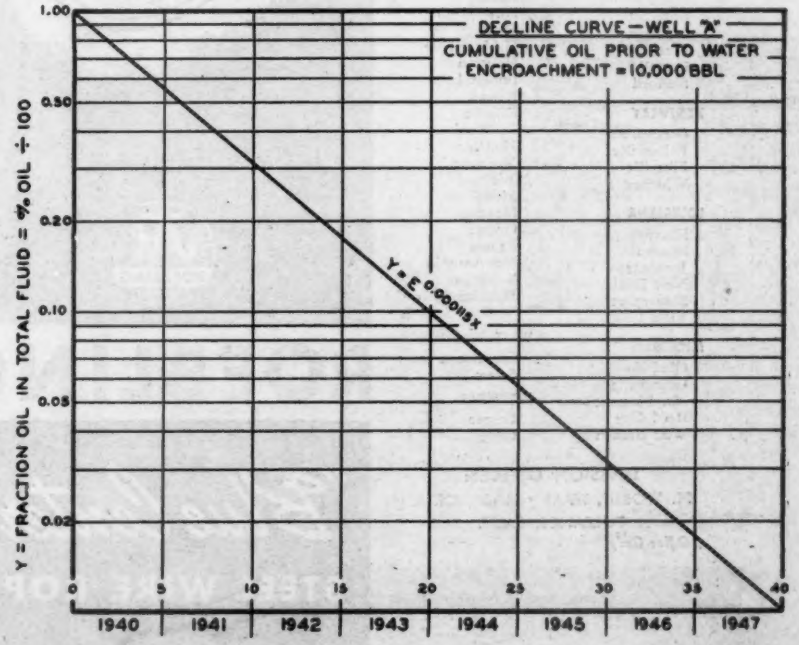
As an example of water calculation, the value of "k" for the curve in Fig. 1 is:

$$k = 2.303 \frac{(\log 1.0 - \log 0.01)}{0 - 40{,}000}$$
$$= -0.000115$$

The negative sign is disregarded for purposes of calculating the water and "k" is given a positive value. Calculating the amount of water produced between the time of first water encroachment and an assumed economic limit of 3.2 per cent oil in total fluid ($r = 30{,}000$, $s = 0$).

$$W = \left(\frac{e^{3.45} - e^{0}}{1 \times 0.000115}\right) - (30{,}000 - 0)$$

$$W = \left(\frac{31.5 - 1.0}{0.000115}\right) - 30{,}000$$
$$= 235{,}000 \text{ bbl. of salt water}$$



NATIONAL SUPPLY COMPANY

BRANCHES LOCATED AT:

ARKANSAS
El Dorado

CALIFORNIA
Avenal
Bakersfield
Long Beach
☆Los Angeles
Orcutt
Riverdale
☆San Francisco
Santa Fe Springs
Taft
Torrance

CANADA
Calgary, Alberta
Okotoks, Alberta

COLORADO
☆Denver

ILLINOIS
Centralia
☆Chicago
Clay City
Crossville
Fairfield
Grayville
Lawrenceville
McLeansboro
☆Olney
Salem
St. Elmo

INDIANA
Princeton

KANSAS
Chanute
Chase
Eldorado
Madison
Pratt
Russell
Stafford

KENTUCKY
Owensboro
Paintsville
Pikeville
Winchester

LOUISIANA
Harvey
Houma
Jennings
New Iberia
Shreveport
Ville Platte

MICHIGAN
Gladwin
Grandville
Mt. Pleasant
Reed City
West Branch

MONTANA
Cut Bank
Kevin

NEW MEXICO
Hobbs

NEW YORK
Bolivar

OHIO
Logan
Toledo
Wooster

OKLAHOMA
☆Bartlesville
Blackwell
Bristow
Cushing
Duncan
Healdton
Hominy
Oklahoma City
Okmulgee
☆Ponca City
Seminole
Tulsa

PENNSYLVANIA
Bradford
Butler
☆Pittsburgh
Titusville

TEXAS
Beaumont
Big Spring
Breckenridge
Corpus Christi
☆Dallas
Denver City
Electra
☆Fort Worth
Freer
Hebbronville
Houston
Imperial
Kermit
Kilgore
La Ward
McAllen
McCamey
☆Midland
Monahans
Nocona
Odessa
Pampa
☆San Antonio
Sundown
Wichita Falls
Willow Springs

WEST VIRGINIA
Charleston
Salem

WYOMING
Casper
Cody

DIVISION OFFICES:
FT. WORTH, TEXAS • TULSA, OKLA.
TORRANCE, CALIF.
☆Office Only

"Your distributor is nearby"

ROEBLING

"Blue Center"
STEEL WIRE ROPE

REPUBLIC SUPPLY COMPANY

BRANCHES LOCATED AT:

ARKANSAS
El Dorado
Patmos

ILLINOIS
McLeansboro
Salem

INDIANA
Griffin

KANSAS
Ellinwood
Russell

LOUISIANA
Lisbon
New Iberia
Rodessa
Shreveport ●

NEW MEXICO
Hobbs

OKLAHOMA
Oklahoma City
Seminole
Tulsa

TEXAS
Alice
Big Springs
Borger
Bruni
Corpus Christi
Electra
Houston
Kilgore
Monahans
Nocona
Odessa
Olney
Pampa
Primrose
Sullivan City
Sundown
Talco
Victoria
Wichita Falls

SALES OFFICES:
MT. VERNON, ILLINOIS
FT. WORTH, TEXAS
DALLAS, TEXAS

Engineering Fundamentals No. 105

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

OIL-BEARING ROCK PERMEABILITY

AS a measure of the approximate rate at which an oil and gas reservoir will yield its contents when the pressure is reduced at the bore of a well, the permeability of the rock is measured. The permeability of a porous rock is a measure of its fluid-transmitting capacity.

The effective (interconnected) pores of a rock are the only ones that contribute to the permeability of the rock, but this does not mean that permeability is directly proportional to effective porosity. It is possible to have two sands of the same effective porosity that show a wide difference in their permeabilities. Permeability is dependent upon the size, shape, and number of the interstitial passages in a given cross-sectional area of a sand which, in turn, depend mainly upon size and shape of the sand grains.

In general, fine-grained sands are of lower permeability than coarse-grained sands. This is not always true, since coarse-grained sands do not always have large pore passages as there may be fine silt or cementing material between the coarse grains which reduce the size of the passages between the grains.

The term **permeability,** as commonly used, means more strictly "normal permeability." **Normal permeability** is a property of the rock itself, and is determined by measuring the resistance offered to the flow of a one-phase fluid through the rock under conditions of viscous flow.

The unit of permeability is the darcy. A rock having a permeability of 1 darcy will permit the flow of a homogeneous (one-phase) fluid of centipoise viscosity through a cross-sectional area of 1 sq. cm. at the rate of 1 cc. per second when a pressure gradient of 1 atm. per centimeter exists in the direction of flow. A more common unit of permeability is the millidarcy, which is equivalent to 0.001 darcy.

The permeability of rocks which may contain oil has been found to vary from practically zero for certain shales and tightly cemented rocks to as high as 25 darcys for certain coarse-grained, well-graded sands. Generally speaking, cores of producing sands show permeabilities ranging between 50 and 2,000 millidarcys.

In general, the permeability of a sand may vary quite rapidly vertically (across bedding planes) but is relatively uniform over wide horizontal extent (parallel to the bedding planes). And, too, any particular core sample will in general show a higher permeability when the fluid flow is parallel to the bedding than when the fluid flow is across the bedding planes. Except in special cases, the permeability parallel to bedding planes, sometimes spoken of as horizontal permeability or lateral permeability, is measured. This is true, because the principal item of interest is in regard to the ease with which oil and gas may flow along the bedding planes to the well bore. Special cases in which one might wish a measure of the permeability across bedding planes would include studies such as the following: (1) Determining the possibility of water coming upward to the bottom of a well bore or of gas channeling downward around a casing seat and through the exposed sand face of a well; (2) estimating the flushing action of the drilling fluid below a bit when drilling a certain formation.

Small Variation in Permeability

Because of the relatively small variation in the permeability measured parallel to the bedding planes, it is generally considered that the permeability measurement from a sample taken at a given depth in a sand is representative of that particular depositional level throughout the area drained by that well. But, on the other hand, because of the possible variation in permeability across bedding planes, samples must be analyzed at fairly close vertical intervals in order to arrive at a fair average permeability for a certain exposed productive sand thickness.

It has been found that in a sand containing more than one fluid the presence of one materially impedes the flow of the other. This has given rise to the use of the term **effective permeability,** which may be defined as the apparent permeability to a particular phase (oil, gas or water) of a sand under a certain condition of saturation with more than one phase. The amount that flow is impeded depends upon the saturations of the fluids in the sand. The lower the saturation of a particular fluid in the sand, the less readily that fluid flows; or, stated in another way, the lower the saturation of a particular fluid in a sand, the lower is the effective permeability to that fluid.

From the definition given for effective permeability, it is evident that a sand containing oil, water, and gas would have three effective permeability values, each of which would be influenced not only by the normal permeability of the sand but also by the relative amounts of the three fluids in the pore space. That is, the sand would have a certain effective permeability to gas, a certain effective permeability to oil, and a certain effective permeability to water for each condition of saturation. However, below a certain percentage saturation with a given fluid the effective permeability of the sand to that fluid may be zero even though quite a large amount of the particular fluid is contained in the pore space.

Relative permeability is another term that has come into use quite recently in the literature dealing with flow through sands. Relative permeability is the ratio of the effective permeability to a particular phase to the normal permeability of the sand.

The unit of effective permeability is the darcy. Relative permeability, being a ratio, has no units.

The effective permeability to oil in a sand formation is never as great as the normal permeability, because of the presence of interstitial water surrounding each sand grain and lining each pore passage. This reduction of the effective permeability to oil below the normal permeability of the sand may be considered as being caused by the fact that the water film which lines the pores between the sand grains reduces the cross-sectional area of the passages available for flow of oil and thus increases the resistance to flow. Since the thickness of the water film on the sand grains tends to be practically constant, regardless of pore size, it is logical that the decrease in permeability due to the presence of interstitial water is more severe in the finer sands having smaller pores, due to the fact that the film thickness occupies a greater fraction of the cross-sectional area of a small pore than of a large pore. From this consideration it is seen that the relative permeability to oil in a formation sand is always below one, and is lowest in the finer-grained sands.

Series prepared by Glenn M. Searns, associate professor of petroleum engineering, University of Oklahoma

LARGE DIESEL POWER UNITS

Available for Immediate Shipment!

ONE 800 K.V.A. 640 K.W., .8 P.F., 3 phase, 60 cycle, 4160/2300 Volt 180 R.P.M. alternating current generator (recently rewound) with Vee belt driven exciter, directly connected to:
1—Nordberg 3-cylinder Air Injection Type EG forced scavenging Diesel engine, 180 R.P.M. (illustrated). Thoroughly overhauled since being removed from service. This fine fuel oil burning Diesel generator unit now available for immediate shipment from stock. *Engine can be furnished without generator for mechanical drive purposes.*

FOUR 350 H.P.—300 R.P.M. Diesel Units
4—Modern design solid injection M.A.N. type Diesel engines now being thoroughly rebuilt in our Los Angeles plant. Will be available for immediate shipment on short notice as mechanical drive units . . . or can be furnished with either 250 Volt D.C. or A.C. generators of either 50 or 60 cycle.

Several other Diesel Engines are available from stock.

SEND US YOUR INQUIRIES TODAY ON THESE OUTSTANDING DIESEL POWER UNITS

BEESON BROS.
ENGINEERING CO.
1408 North Spring St., Los Angeles 12, California

DON'T SABOTAGE OVERSEAS SHIPMENTS

GLU-WELD—Products of the Oil and Gas industry must reach our fighting men in good condition if we are to achieve final victory. It must be packaged for delivery to any point in the world. GLU-WELD adhesives used to seal waterproof paper liners and "Victory Board" containers assure the packager of perfect closures whether the shipment ultimately arrives at the freezing ports of Russia or the tropical climate of the South Pacific.

Write today for our booklet "GW-1", which will tell you the full story on GLU-WELD.

Or better yet, send us a small sample of your board and we will forward a sample of the proper GLU-WELD formulation.

GLU-SHIELD—Where government specifications require the use of a waterproof lacquer to attach and coat labels, GLU-SHIELD is the perfect choice.

IN THE EAST

Union Paste Company
1605 Hyde Park Ave., Hyde Park 36, Mass.

IN THE MID-WEST

The F. G. Findley Co.
1250 No. 10th St., Milwaukee 5, Wis.

Natural Gas

Liquefied Petroleum Gas Subcommittees Appointed

WASHINGTON, D. C. — Appointment of industry subcommittees to advise and consult with PAW on wartime problems affecting the distribution of liquefied petroleum gas was announced here last week.

The subcommittees, composed of representatives of the industry, will function in each of five districts for the purpose of assisting PAW on all matters "relating to the proper coordination of the activities and problems pertaining to the distribution of liquefied petroleum gas, so far as these problems are related to the furtherance of the war program."

The industry groups will work with PAW through the appropriate district committees and the appropriate district directors.

Members of the five subcommittees follow:

District 1. — Walter A. Naumer, Carbide & Carbon Chemicals Corp., New York, chairman; John B. Clark, Standard Oil Co. of New Jersey; P. A. Anderson, Utilities Distributors, Inc., Portland, Me.; K. H. Koach, Green's Fuel, Inc., Sarasota, Fla.; C. D. Whitfield, Philips Petroleum Co., Washington, D. C.; Mark Anton, Suburban Gas Co. of New Jersey, Livingston, N. J.

District 2.—George R. Benz, Phillips Petroleum Co., Bartlesville, Okla., chairman; Charles Russell, Thermogas Co., Des Moines, Iowa; Ross Roberts, Carbide & Carbon Chemicals Corp., New York; Frank B. Boice, Shell Oil Co., Inc., New York; George W. Bach, Skelly Oil Co., Kansas City, Mo.; John L. Locke, Northwestern Blaugas Co., St. Paul, Minn.

District 3.—Louis Abramson, Petrolane Gas Corp., New Orleans, La., chairman; G. L. Brennan, Warren Petroleum Co., Tulsa; J. Woodward Martin, Lone Star Gas Co., Dallas, Tex.; T. A. Sacra, Sacra Brothers, Roswell, N. M.; B. T. Harris, Butane Gas Co., Inc., Little Rock, Ark.; W. A. Baden, Anchor Petroleum Co., Tulsa.

District 4.—Dr. R. W. Leslie, Wasatch Oil Refining Co., Salt Lake City, Utah, chairman; H. H. Torbet, Union Oil Co., Pueblo, Colo.; P. H. Anderson, Skelly Oil Co., Denver, Colo.; S. J. Connolly, Glacier Producing Co., Butte, Mont.; M. P. Huntington, Stanolind Oil & Gas Co., Casper, Wyo.; C. R. Hustead, Denver Propane Co., Denver, Colo.

District 5.—D. D. Purrington, Standard Oil Co. of California, San Francisco, Calif., chairman; P. E. Foote, Liquefied Petroleum Gas Corp., Long Beach, Calif.; W. T. Joplin, Butane Corp., Phoenix, Ariz.; C. M. Ambrose, Liquefied Gas Corp., Seattle, Wash.; D. J. Tadich, Shell Oil Co., San Francisco, Calif.; Tallent Ransome, Ransome Co., Emeryville, Calif.; P. S. Magruder, General Petroleum Corp., Los Angeles, Calif.

Navajo Helium Plant Adds To Productive Capacity

WASHINGTON, D. C. — The new helium-extraction plant being built by the Bureau of Mines on the Navajo Reservation in New Mexico has been named the Navajo Helium Plant.

Greatly expanded since the United States entered the war, the bureau's helium plants are now producing approximtaely 25 times as much of this lightweight, noninflammable gas as in prewar days. Currently the bureau is meeting the requirements of the armed forces for antisubmarine blimps, barrage balloons, meteorological balloons, and other uses. In addition, considerable quantities of helium are employed for medical purposes, in diving and caisson work, and in welding magnesium airplane parts.

Modification of the original Texas helium plant, completion of a new plant, and construction on three other plants are recent developments in the bureau's helium program. Additional drilling in the Cliffside helium-bearing gas field of Texas also has been done.

Third Personnel Session Planned in Southwest

DALLAS, Tex.—The third Southwestern personnel conference of the American Gas Association will be held here November 3 and 4 for further discussion of wartime-manpower problems in the natural-gas industry and related operations.

Two definite accomplishments have been registered at the previous conferences, the most recent of which was held here August 25 and 26. The conference completed a set of distribution-job descriptions for War Manpower Commission approval and prepared "yardstick" rates of pay for those jobs for National War Labor Board consideration. The job descriptions were compiled by a committee of which O. L. Jones, Tulsa, was chairman, and the wage-rate committee was headed by F. F. McMullen, Houston, Tex.

M. V. Cousins, Shreveport, La., is chairman of the personnel conference.

Carbon-Block Cars Placed Under Pool Authority

WASHINGTON, D. C.—The Office of Defense Transportation last week approved a plan for the pooling of all privately owned covered-hopper cars used in the carbon-black transportation service. The ODT action, which was taken in cooperation with the War Production Board, took the form of an order (Special Order ODT R-6), which becomes effective September 20.

ODT officials said that the pooling plan was instituted in an effort to get more efficient utilization of the specially built carbon-black cars and to free some of the cars for use by other industries. It was pointed out, however, that their use outside the carbon-black industry is greatly limited, due to their light-weight construction and other features.

At the present time the carbon-black cars are leased by the owners to the consumer trade. Under the ODT plan, all the cars now in use in the industry will be leased to a pool authority, which will be set up by the industry. The pool authority, in turn, will sublease the cars to the carbon-black producer or to a bulk consumer under terms and conditions which are satisfactory to the car owners.

The pool authority will assign each carbon-black producer, as nearly as possible from the producer's own cars, the number of cars which he will require during each calendar month. Any excess cars not required by a car owner shall be subject to diversion by the pool authority to other carbon-black shippers or to shippers of other commodities under terms acceptable to the car owner.

Communications concerning the order should refer to "Special Order ODT R-6" and should be addressed to the Division of Railway Transport, Office of Defense Transportation, Washington, D. C.

New Operating Company Chartered in Ohio

COLUMBUS, Ohio.—The Syracuse Home Utilities Co. was granted a corporation charter with an authorized capital of $25,000 for the purpose of engaging in the "production, sale and distribution of gas."

The company supplies gas to a number of small towns along the Ohio River in Ohio.

Spicer Transmissions and Universal Joints...

Serving in peace and war. Spicer Transmissions, Propeller Shafts and Universal Joints have helped make famous names in truck transport service. And these same Spicer units now are doing exceptionally heavy duty in Crash and Special Service Trucks on United Nation's airfields all over the world. Spicer peacetime quality permitted quick conversion to war needs, and will permit fast delivery for automotive production when the war is over. Spicer Manufacturing Corporation, Toledo, Ohio.

40 YEARS OF Spicer SERVICE

BROWN-LIPE CLUTCHES AND TRANSMISSIONS • SALISBURY FRONT AND REAR AXLES

SPICER UNIVERSAL JOINTS • PARISH FRAMES, STAMPINGS

REFINING

Standard of Indiana Completes Toluene Unit

CHICAGO.—Standard Oil Co. of Indiana's new toluene plant at its Whiting, Ind., refinery is now completed and will shortly be shipping toluene, the company revealed last week in a "progress report" mailed with dividend checks to stockholders.

Standard of Indiana will also rank as one of the leading producers of 100-octane aviation gasoline with the construction of other new units, most of which will be completed by the end of this year, the report states. These include new alkylation, isomerization, and catalytic-cracking units and new fractionating towers.

To help solve the lack of facilities for transporting crude oil from new fields, which, according to the report, is one of the causes of gasoline rationing, Standard's subsidiary, Stanolind Pipe Line Co., this fall will start construction of a new 16-in. pipe line from the Slaughter pool of West Texas to Drumright, Okla., with completion planned for April 1, 1944. Standard's net crude reserves as of July 1 this year were approximately 33,000,000 bbl. greater than at the first of the year.

The "progress report" also reveals that subsidiary companies are already operating or have under way construction of new units for toluene and aviation gasoline.

The report shows consolidated net earnings of Standard of Indiana for the first 6 months of 1943, as announced August 13, totaling $22,079,417.50, or $1.44 per share, as against $19,390,525.92, or $1.27 per share, for the first half of 1942.

Port Neches Rubber Plant Starts Operation

PORT NECHES, Tex.—The world's largest synthetic rubber plant, with capacity for producing 120,000 tons of synthetic rubber annually and

Sketches of Plant Operators

D P. BAILEY, who became general manager of the Texas Co.'s largest refinery at Port Arthur, Tex., August 1, returns to the plant in which much of his early operating experience was attained.

After graduating from the University of Texas in 1922 with a B.S. degree in chemical engineering, he started his professional career with Standard Oil Co. (Indiana) at the company's refinery in Sugar Creek, Mo., as a research chemist.

He joined the Texas Co. in 1927 and was assigned duties at Port Arthur dealing with various operating matters. He was transferred to Tulsa in 1930 as assistant superintendent of the Texas Co. refinery. Three years later, Mr. Bailey was transferred to Lockport, Ill., as assistant superintendent in charge and in the following year he was moved to France as superintendent of the company's plant at Ambes.

When France fell in 1940, Mr. Bailey returned to New York and was assigned to the handling of special investigations. He was granted a leave of absence by the company in December 1941 to accept a position with the Office of Petroleum Coordinator (now Petroleum Administration for War) as director of refining in District 2 with headquarters in Chicago.

He became chief of the operations section, Refining Division, PAW, where he stayed until his departure from government service on July 31.

STOODY 6
Applied by Welding Reclaims Worn Valves

NOW worn valves, valve parts and pump sleeves can be reconditioned to outperform new factory parts by a simple oxyacetylene welding application using Stoody 6. This new Stoody alloy, composed principally of cobalt, chromium and tungsten, will not oxidize—even under intense heat, has high impact strength in relation to its hardness, offers excellent resistance to abrasive wear, and is perhaps the easiest of all hard-facing alloys to apply. Stoody 6 is highly efficient for hard-facing new or old internal combustion exhaust valves, gate, globe and angle valves, hot oil pump sleeves, etc.

Trial order of 10 lbs. of 3/16" diameter Stoody 6 at $4.25 per lb. will prove the merits of this alloy for any applications involving heat, corrosion, abrasion and impact. Available on AA-4 or higher priority rating.

STOODY COMPANY
1138 West Slauson Ave., Whittier, Calif.

STOODY HARD-FACING ALLOYS
Stop wear . . . Eliminate Repair

All-Weather Pumping *Is Assured* by the use of CENTURY TYPE SCT SPLASHPROOF MOTORS

also Longer Equipment Life

Century Type SCT Splashproof Pumping Unit Motors are designed and engineered to assure continuous, economical pumping regardless of weather conditions.

They are scientifically protected against the hazards of heat and cold — rain, snow, sleet, and ice.

In addition, they reduce wear and tear on your equipment, lengthen its life, and keep operating costs low. This is accomplished by designing the motor with an unusually high torque to start the toughest loads in cold weather, plus an exceptionally high slip which means that the motor speed pulls down when the load comes on. And, in slowing down against power peaks, impacts on equipment are cushioned, jolts and jars are reduced. Hence pumping units last longer.

Not only for pumping wells, but for many other oil industry applications, you'll find a Century Motor especially engineered for each particular job. For full information, see your regular supply store or call in your nearest Century Service and Application Engineer.

CENTURY TYPE ARRC GENERATORS

Where public service current is not available, a Century Type ARRC Generator will provide adequate, continuous, economical power. Depending on the load per motor and size of Generator, from 10 to 30 wells can be pumped from one Generator alone.

CENTURY ELECTRIC COMPANY

1806 Pine Street, St. Louis, Missouri

Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World

built at Port Neches, Tex., by B. F. Goodrich Co. is now on production.

The plant, capable of turning out a fifth of the nation's normal rubber requirements, is the largest to be constructed in the government's synthetic-rubber program. B. F. Goodrich will operate two of the 30,000-ton units.

Butadene for the plant comes by pipe line direct from the new plant of the Neches Butane Products Co., a few hundred feet away. Gulf Oil Corp., Texas Co., Pure Oil Co., Atlantic Refining Co. and Magnolia Petroleum Co. are the companies composing this organization.

Other butadiene plants are operated at Baytown by Humble Oil & Refining Co., at Borger by the Phillips Petroleum Co., and at Houston by the Sinclair Refining Co. The styrene for Texas rubber will be produced by plants operated by the Monsanto Chemical Co. at Texas City and by the Dow Chemical Corp. at Velasco.

PAW Lifts Ban on Civilian Consumption of Asphalt

WASHINGTON, D. C.—Lifting of the ban on paving uses of asphalt, asphaltic products (except road oil), tar, and tar products was announced September 11 by Petroleum Administrator Harold L. Ickes.

This action was taken by revoking PAW Recommendation 45 which was issued in October 1942, controlling the use of these products throughout the country.

The ban on the use of road oil, however, was continued by issuing Petroleum Directive 72, which prohibits the delivery or acceptance of road oil for paving or dust palliative purposes on roads or any other surfaces in the United States.

Explaining the dual action taken, Deputy Administrator Ralph K. Davies said:

"During the past year there has been a decrease in military demands for asphalt and tar products due to the completion of major paving projects, so that now the supply and demand have approached a balance and there no longer is an over-all shortage of these petroleum products."

Degrading of Instrument Priorities Is Protested

WASHINGTON, D. C. — Proposed reduction in priority ratings for key components of industrial instruments would be detrimental to the industry, members of the Industrial Instrument Advisory Committee agreed at a meeting with War Production Board representatives in Washington last week. The proposed basic rating assigned to industrial instruments is AA-2x, the committee was told.

Members of the committee pointed out that the industrial instrument industry used only a small percentage of the over-all production of key components, but that industrial instruments should have a priority rating commensurate with their essentiality as key equipment for practically every vital war program.

The industrial instrument industry faces special problems because of the wide variety of products included in its scope. These products include pyrometers, temperature controllers, industrial thermometers, pressure gages, control valves, gage glasses and steam-engine indicators, all essential components of petroleum refining facilities.

OPA Changes Method of Fixing Product Ceilings

WASHINGTON, D. C.—Four changes were made last week in the method of determining ceiling prices for petroleum products which the Office of Price Administration asserted were for clarification of regulations.

The changes, which are made in Revised Price Schedule 88 by Amendment 127, effective September 13, 1943, follows:

1. Section 1340.159 (b) (1) formerly provided that a seller's maximum price on petroleum products shall be based on the lowest quoted price published on certain dates in three different periodicals. The amendment removes from all consideration prices published in any periodical except the October 8, 1941, issue of National Petroleum News.

2. To accomplish the objective of having only one reference periodical it is necessary to establish specific ceilings for 32-36 gravity ordinary gas oil f.o.b. refineries in Oklahoma; 32-36 zero gas oil f.o.b. refineries in Oklahoma, and 41-43 water white kersone f.o.b. refineries in North Texas, for shipment to Texas and New Mexico destinations. These are now established at 3 cents per gallon; 3.375 cents per gallon, and 4 cents per gallon, respectively. No change is made from previously existing maximum prices, the purpose being merely that of clarification.

3. The amendment also provides that quotations for motor gasoline. kerosene and Nos. 1 to 6 fuel oils, as set forth on Page 42 of the October 8, 1941, issue of National Petroleum News under the heading "Atlantic Coast," shall be applicable only for such products when delivered into motor transports and tank cars.

4. Further clarity is provided by withdrawal of the discount provision from its former position in Appendix A and its insertion under Section 1340.159 (b) (1) since it is only to prices determined thereunder that the discount applies.

VALVES

PIPE FITTINGS and FLANGES

Cast and Forged STEEL

CAST IRON

Standard and High Pressure

☆

Reconditioned — Guaranteed

to perform like new

For more than 30 years we have been buying and selling used Oil Refinery Plants and Equipment. Large stocks of Pumps, Pressure Vessels, Heat Exchangers and miscellaneous items always carried in stock.

Send us your inquiries!

BROWN-STRAUSS CORP.

1446 Guinotte . . . Kansas City, Mo.

NATIONAL AIROIL

OIL and Gas BURNING EQUIPMENT

Serving the Petroleum-Chemical Industry for over 30 Years

For Details, write

NATIONAL AIROIL BURNER COMPANY, INC.

1236 E. Sedgley Avenue

PHILADELPHIA 34, PENNA.

FRASER-BRACE ENGINEERING CO., INC.

Design, construction and installation of complete plants and projects.

Mechanical, Heavy Industries, Shipbuilding, Hydro-Electric Developments, Power Plants, Chemical and Refining Plants, Process Industries, Metallurgical Developments and Processes, Explosives, Plastics, Water Supply and Treatment, Sewage and Industrial Wastes Treatment.

REPORTS—APPRAISALS CONSULTING

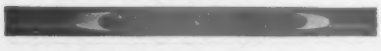
10 East 40th Street New York, 16, N. Y.

Tube Borium Keeps 'em digging

DULL IN 3 DAYS
STILL SHARP AFTER 30 DAYS
STOODY TUBE BORIUM* KEEPS DITCHER TEETH SHARP ...ELIMINATES FREQUENT SHUT-DOWNS FOR TOOTH CHANGES...CUTS REPLACEMENT COSTS UP TO 75%

The two ditcher teeth pictured above were used on the same machine and operated under identical conditions.
The unprotected tooth at the top had to be sharpened every three days and was too short for further service after six sharpenings.
But the Borium-protected tooth at the bottom operated for 40 days and wore only ½". It was simply resharpened in the forge, retipped with Tube Borium, and put back on the ditcher for another 40 days' service.
Before the tooth was finally worn out, it had operated a total of 120 days!
Tube Borium makes such savings possible because the deposits represent the ultimate in wear resistance and the ability to cut hard earth formations.

*Stoody Tube Borium is supplied in rods of 1/8", 3/16", 1/4" and 3/8" diameters and is available for either oxyacetylene or D.C. electric application. Prices and specifications are yours for the asking.



These tungsten carbide particles do not melt when tube is applied but are held in suspension in a mild steel matrix forming a deposit resembling coarse sandpaper.

Send for free booklet on TUBE BORIUM, showing sizes and styles of rods and recommended methods of application.

STOODY COMPANY
1138 West Slauson Ave., Whittier, Calif.

STOODY HARD-FACING ALLOYS
Stop wear... Eliminate Repair

PIPE LINES

More WEP Stations Will Increase Capacity Soon

With the completion of several additional pump stations within a week, War Emergency Pipelines, Inc., will be in a position to increase the throughput of the 24-in. crude-oil line in the section between Norris City, Ill., and Phoenixville, Pa.

For the construction of the WEP 20-in. products pipe line, 1,139 miles of 20-in. and pipe of smaller diameter had been completed early this week. At that time only 29 miles remained to be laid for the section from Gulf Coast refineries to the Norris City terminal.

Magnolia's West Texas Line To Start in November

The War Production Board's approval of construction of a new pipe line from Midland to Corsicana, Tex., will provide a much-needed additional outlet for the oil of the rich West Texas-New Mexico Permian basin, last known area in which United States crude-oil production can be substantially increased, Petroleum Administrator for War Harold L. Ickes announced last week.

The new pipe line will carry 42,000 bbl. of crude oil daily from the Seminole and adjacent producing fields to connecting lines that serve refineries on the Texas Gulf Coast. The Magnolia Pipe Line Co., builders of the line, will start immediate construction of two loops for the line between Seminole and Midland, Tex., to be built with second-hand pipe now available. Pipe laying on the main line, Midland to Corsicana, will start in November, 30 days ahead of the original schedule, because PAW has arranged a month's advance in the delivery of the required new pipe.

Commenting on the importance of this additional PAW pipe-line project, Petroleum Administrator Ickes said:

"The still expansible production of the West Texas oil-producing area is important to the maintenance of aboveground crude-oil supplies. We have saved about 30 precious days over the original construction schedule, and 30 days is important time in the development of new outlets for the last major field in which we know we can open the wells for freer production without permanently endangering our basic petroleum reserves."

The combined initial capacity of two new pipe lines will provide for the movement of 107,000 bbl. per day both to Gulf Coast and Midwest refineries from West Texas.

The other line is to be built by the Stanolind Pipe Line Co. from the Slaughter field, West Texas, to Drumright, Okla., with initial flow of 65,000 bbl. a day. Crude oil will be delivered to refineries in Oklahoma and to other plants throughout the Middle West via existing pipe lines.

The new Magnolia line will consist of 335 miles of new 12-in. pipe and 46 miles of 8-in second-hand pipe. A total of 29,900 tons of new steel will be required for the 12-in. section and 140 tons of new pipe will be required to round out the 8-in. diameter loops.

In connection with the enlargement of the carrying capacity of the Midland-Seminole trunk line, Magnolia is also preparing to augment the system from Seminole to the Slaughter field in Hockley, Cochran and Terry counties by laying about 7½ miles of 2, 3 and 4-in. gathering lines in the Apco-Warner Ordovician area of Pecos County which is well advanced. Magnolia will take the oil collected by those feeders to the Imperial pump station through 12 miles of 4-in. line, now being strung.

Stanolind Applies to PAW For Elk Basin Line Permit

WASHINGTON, D. C.—An application by Stanolind Pipe Line Co. for permission to construct a line from the Elk Basin, Wyoming, oil field to the Stanolind trunk line from Wyoming to Missouri has been filed with the Petroleum Administration for War, officials disclosed last week.

The Stanolind company, however, did not request immediate action on the request, explaining that if construction is allowed, it will not be started until next year.

Since the project is not urgent, PAW followed its usual procedure and referred the request to the transportation committee of District 4, which is considering several other pipe-line projects for that area. No report from the committee on its recommendations has yet been received by PAW, it was said. Final action will await the committee report.

PIPE-LINE PERSONALITIES

LEWIS F. SCHERER, assistant chief engineer, Texas Pipe Line Co., is now serving as superintendent in charge of construction for all pump stations on both the eastern extension of the WEP 24-in. crude-oil line (Norris City, Ill., to East Coast) and the

20-in. products line from the Gulf Coast to the East Coast.

He was born in 1901 at Ottawa, Ill., where he grew up and went to school. In his high school years, he took time off for cycle-car racing at Phoenix, Ariz., and worked as laborer during construction of the Midwest refinery, Casper, Wyo.

While playing football at the University of Illinois, he broke his nose. His course in mechanical engineering led to graduation with a bachelor of science degree in 1925. In a year he took off, he taught machine shop practices, served as carpenter's foreman on construction of locks on the Illinois River and did some contracting of his own.

After graduation, he had various assignments in the Fairbanks-Morse Co. engineering department, Beloit, Wis., where he was engaged in the experimental laboratory on design of diesel engines and in the publication department.

Through Engineer Societies Service, he secured a job with Texas Pipe Line Co. as design engineer, a month before Oscar Wolfe succeeded E. H. Catlin as chief engineer.

From the beginning of the application of cathodic protection, he has been actively interested in this technique as well as methods of combating internal corrosion of gasoline pipe lines. He has been chairman of the A.P.I. corrosion committee. In 1935 he organized the Mid-Continent Cathodic Protection Association, later merged with P.I.E.A.

In 1926, he married Lois Huggins, who attended the University of Illinois when he did. They have two children, Catherine Joanne, 15, and Lewis F. Scherer, Jr., 11. His hobbies are his shop where he enjoys making things work and his hydroponics or water garden where he experiments with unusual ways of making plants grow.

Another Spread Added For Panhandle Eastern Loop

A second spread is being added for the laying of 86 miles of 24-in. in Indiana and Ohio contracted by Stanley & Bledsoe Construction Co. for Panhandle Eastern Pipe Line Co. as part of the program for increasing the capacity of the system between the Panhandle and Maumee, Ohio. At the beginning of this week, approximately 39 miles had been laid in 39 days.

The contractor's headquarters are at Elwood, Ind., where operations are directed by Carl Stanley, superintendent. Each of his assistants, Earl Munson and Edwin Kiethley supervises a spread.

ODT Holds Transportation Workers Essential to War

DALLAS, Tex.—Transportation is an essential war industry, and most transportation workers are deferable from military service, John C. Massenburg, regional director, Office of Defense Transportation, Dallas, said last week in asking the workers to stay on their essential jobs.

Transportation workers should stay where they are. No transportation activities are on the nondeferable list, and with a few minor exceptions, no transportation occupations are classed as nondeferable.

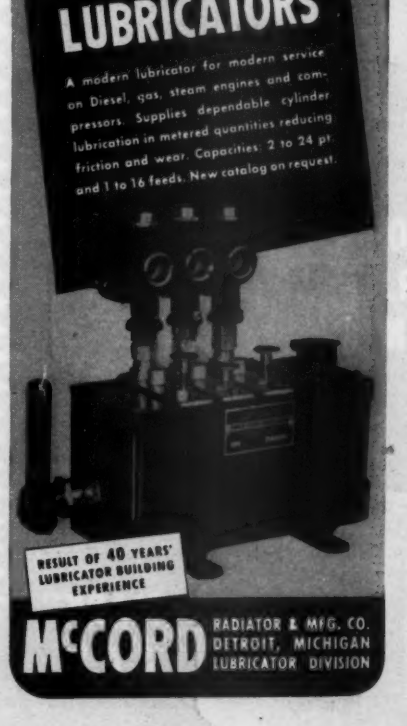
SHARMAN
and
ALLEN
General Contractors
•
OIL • GAS • GASOLINE
WATER • PIPE LINES
Phone: CHARTER 4-2531
Oil & Gas Building HOUSTON, TEXAS

"CLEVELANDS"

GEARED TO FIELD REQUIREMENTS
Are Unsurpassed for Main and Field Line Ditching or Stripping Pipe

THE CLEVELAND TRENCHER COMPANY
Pioneers of the Small Trencher
20100 ST. CLAIR AVENUE CLEVELAND, OHIO

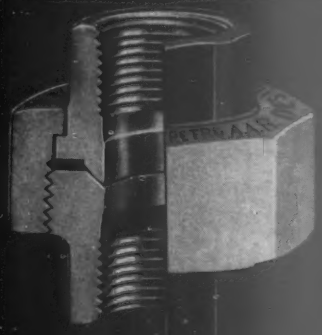
McCORD
Class S.F.
LUBRICATORS
A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request.



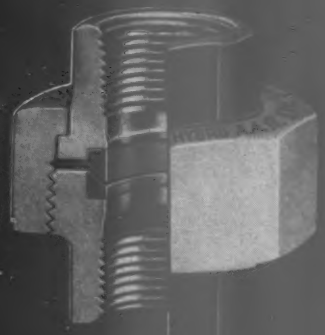
RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE
McCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN
LUBRICATOR DIVISION

Forged Steel
CHECK VALVES AND UNIONS
by
CLAYTON MARK & COMPANY

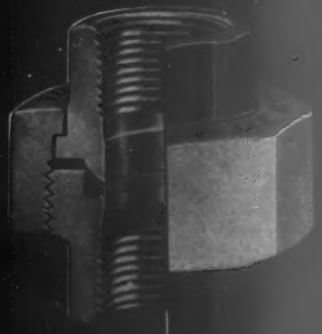
Clayton Mark & Company's Union Check Valves for all service demands are available in three types: PETRO, 4000 lbs. Test; HANDLE-Bar, 4000 lb. Test; HYDRO, 1000 lb. Test.



"PETRO" A.A.R. DESIGN



"HYDRO" A.A.R. DESIGN



"MARK" A.A.R.

YOU are guaranteed "Proved Performance" when you specify by trade name, Clayton Mark & Company's Forged Steel Union Check Valves and Unions. Correct design and precision manufacture insures their quality, extra weight and strength safeguards them against stretching, distortion and extreme pressures and temperatures.

Permanently lubricated nut threads eliminate galling or freezing. Union seats are 45°, Ball to Cone, machined and cold rolled.

Clayton Mark & Company, originators and pioneers, *America's First Line* of Forged Steel Unions.

THE CONTINENTAL SUPPLY COMPANY

General Offices: DALLAS, TEXAS

EXPORT DIVISION

30 Rockefeller Plaza New York City, N. Y.

Representatives

MEXICO ARGENTINA ENGLAND TRINIDAD BRAZIL

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

Exploration and Drilling

Week's Highlights

THE avidity with which operators are seeking new oil production was again demonstrated by high bids at auctions on leases in the Little Buffalo and Elk Basin fields in Park County, Wyoming.

The Little Buffalo Basin field at the south end of the county has been operated for nearly 30 years as a gas field and has never produced a barrel of oil. Nevertheless six parcels scattered around the edges of the gas field brought more than $650,000 or an average of $546.30 per acre. The bids were undoubtedly influenced by the prolific Tensleep production found at Elk Basin, which lies over 60 miles to the north as well as the Embar-Tensleep oil found in Oregon Basin in the intervening area.

At the same time, three tracts were sold around the edge of the structure at Elk Basin, as mapped on the upper sands, for an average of $5,372 an acre.

The growth of Wyoming as an oil-producing state is demonstrated by the fact that present production is almost double that of 1938. During that period, Wyoming has risen from ninth to eighth place in the rank of oil producers, having passed Arkansas and is rapidly overtaking New Mexico, which is in seventh place. The present interest is largely confined to the Big Horn Basin but other areas are also due for a play soon.

During the past week, the importance of gas is again emphasized. In the Appalachian region (p. 86), there is an increase in drilling due to the demand for gas which is now selling at a price which makes it more profitable to bring in an average gas well than an average oil well, even at the relatively high price prevailing for Pennsylvania Grade crude.

In California (p. 89), drilling for gas ranks second only to drilling for heavy crude in the shallow old fields. The activity in the heavy-oil fields, incidentally, can be accounted for mainly by the increase in price for that grade of crude.

WEST TEXAS: The Holt horizon of the Clear Fork has proved productive in the Keystone area, making the third pay for the field. Fullerton has been extended 1/2 mile and Slaughter has been extended to the northwest by a well which may link the field to the Bieg-Wright pool (p. 80).

PENNSYLVANIA: Good results in the Helderberg (lower Devonian) may result in a general deepening of small Oriskany producers to the lower pay (p. 86).

NORTH TEXAS: An extension is reported for the Burns-Midway pool. Two prospective discoveries in Throckmorton County are attempting to complete (p. 83).

NEW MEXICO: Two discoveries, north and south of the main trend, respectively, are expected to start plays along these parallel structures (p. 80).

OHIO: The South Wayne gas field has been extended by one of the biggest wells ever brought in in the area (p. 81).

OKLAHOMA: After 10 years a deep test near Binger was carried down to nearly 14,000 ft., made hot water and is being abandoned (p. 87).

SOUTHWEST TEXAS: A gas-distillate and a gas pool have been opened in Bee County (p. 83).

MISSISSIPPI: A new pool has been opened in the Tinsley-Pickens sector (p. 90).

COMPLETIONS IN ALL FIELDS . . .

(Week ended September 11, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna., W. Va.	51	18	5	74	145,490	2,364	2,398
Ohio	3	10	5	18	49,779	608	771
Indiana	3	0	4	7	11,571	158	230
Kentucky	3	0	2	5	14,092	275	144
Illinois	17	0	13	30	78,073	1,196	1,182
Michigan	5	2	10	17	42,160	401	481
Kansas	10	0	16	26	91,821	1,115	1,080
Nebraska	0	0	0	0	0	20	25
Missouri-Iowa	0	0	0	0	0	10	10
Oklahoma	12	3	10	25	83,429	823	843
Texas:							
North Central Texas	31	0	19	50	111,089	989	798
West Texas	6	1	2	9	34,353	586	1,012
Texas Panhandle	5	0	1	6	18,496	127	262
Eastern Texas	5	0	0	5	33,562	196	278
Texas Gulf Coast	5	1	4	10	77,579	311	521
Southwest Texas	8	3	11	22	122,623	629	773
Total Texas	60	5	37	102	297,702	2,838	3,644
North Louisiana	3	3	2	8	31,265	219	333
Louisiana Gulf Coast	5	1	3	9	68,828	254	348
Total Louisiana	8	4	5	17	100,093	473	681
Arkansas	5	0	5	10	44,513	173	122
Mississippi and Southeast	0	0	0	0	0	58	41
Montana	5	0	5	10	25,279	151	132
Wyoming	1	0	0	1	5,760	91	74
Colorado, Utah	0	0	0	0	0	18	13
New Mexico	8	0	2	10	30,416	154	168
California	22	0	11	33	125,861	908	513
Total United States	213	42	130	385	1,146,039	11,834	12,552
Total previous week	208	44	143	395			
Week ending Sept. 12, 1942	173	57	101	331			

PERMIAN BASIN

Holt Horizon Proves Third Pay in Keystone Area

MIDLAND, Tex.—The third pay for the Keystone area of Winkler County was assured when Richardson & Bass 4 Walton, 440 ft. from south and west lines of Section 5, Block B-2, Public School Lands, flowed 13 bbl. of oil in 9 hours from the Holt horizon of the Clear Fork lime through perforations from 4,605-20 ft. The test was a deepening job from Permian lime production at 3,376 ft., and was carried to a total depth of 4,900 ft., with top of the Clear Fork logged at 4,792 ft., with oil stains at 4,825-50 ft. A bad cement job caused a squeeze job on the first perforations from 4,680-4,850 ft. It is likely that acid treatment will boost the production, as it has in other areas producing from the Holt zone, and further deepening of depleted wells in the Permian lime may be expected throughout northern Winkler County.

The Fullerton pool of Andrews County was given a ½-mile-north extension at Mid-Continent Petroleum Corp. 1 S. A. Eilers, NW NW Section 14, Block A-32, Public School Land, when it flowed at the rate of 6 bbl. per hour after treating the upper pay with 8,000 gal. acid. The extension is being carried deeper to take in all the pay zones before final completion, but an east offset by the same operator has been staked. The pool is now 2 miles long and 2 miles wide.

Gaines County.—In the Russell area of northwestern Gaines County, Magnolia & Atlantic 1-459 Havemeyer & Jennings, Section 459, Block G, ½ mile south of the discovery well, set 5½-in. casing at 7,404 ft. and was preparing to treat with acid the saturated section. Total depth of the well is 8,000 ft., with saturation from 7,721-78 ft.

Cochran County.—Extension for the Slaughter pool seemed assured when Superior Oil Co. of California 21 Carrie Slaughter Dean had top of the pay at 4,880 ft., total depth 4,887 ft., and was preparing for completion attempt. This well extends the west part of the Slaughter pool over a mile north, and serves as a connecting link between the Slaughter and the Bieg-Wright pools.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—With the successful completion of Maljamar Oil & Gas Co. 2-X Cheesman, 22-18s-32e, new lime discovery south of the Maljamar pool, it is predicted that there will be several other tests drilled on the trend south of Maljamar, Jackson-Grayburg and Loco Hills pools, trying to find the lime reef paralleling that on which the above-named pools are located. The Shugart area, in Township 18s, Range 31e, is due for further exploitation, as is also the Corbin area, in Township 18s, Range 33e. Operators are of the opinion that there are a series of parallel pools south of the known producing areas, with producing possibilities governed by sand and lime conditions on the reef which is already pretty well defined. On the same theory, the east-west trend north of Maljamar is due for further exploration on the strength of the new discovery in 7-17s-33e by C. T. McLaughlin and Cosden Petroleum, which was completed on the pump for 96 bbl. per day.

PANHANDLE

AMARILLO, Tex.—Search for oil from the Ordovician beds in the Panhandle continues, with Stanolind Oil & Gas Co. and Texas Co. staking locations for a 6,500-ft. wildcat test in southeastern Donley County. It is the companies' 1 Troy Boone, and is located 660 ft. from north and west lines of SW Section 48, Block 20, H.&G.N. Ry. Co. Survey. In the same county, Shamrock Oil & Gas Co. 1 Cornelia Adair estate, Section 15, Block A, J. G. Adair Survey, cored from 5,220-29 ft., recovering 2½-ft. of granite wash and shale with no shows of either oil or gas, and drilled to 5,280 ft. in granite wash, total depth.

WILDCAT COMPLETIONS

West Texas

Irion County: Pure Oil Co. 1 J. D. Sugg, 660 ft. from N, 1,980 ft. from W, Sec. 1,942, Althossen Sur., elev. 2,397 ft., Yates 1,010 ft., lime 1,700 ft., show oil 1,842-52 ft.-1,937-47 ft., dry, T.D. 2,527 ft.

Terry County: Tex-Pac Coal & Oil 1 J. D. McCullough, 660 ft. from N, 1,980 ft. from E, Sec. 29, Blk. K, Public School Land, elev. 3,533 ft., Yates 3,500 ft. Brown lime 4,450 ft., Gray lime 4,820 ft., no shows, dry, T.D. 5,553 ft.

Southeast New Mexico

Lea County: Maljamar Oil & Gas 2-X Cheesman, 660 ft. from N & E, Sec. 22-18s,32e, pump 75 bbl., pay 4,630-76-4,771 ft., shot 270 qt., T.D. 4,840 ft. Discovery.

C. T. McLaughlin & Cosden Pet. 1 State, NW NW Sec. 7-17s-33e, pump 96 bbl., pay 4,170 ft., T.D. 4,234 ft. Discovery.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 11 crude oil	Distillate, allied products	Sept. PAW quota all oils	Sept. 4 crude oil
Arkansas	76,645	4,000	80,100	76,400
California	785,150	46,000	835,000	777,350
Colorado	6,615	.....	6,500	7,200
Eastern fields	78,350	7,300	86,600	73,950
Illinois	211,400	11,500	222,800	211,850
Indiana	13,300	.....	13,800	14,750
Kansas	290,450	5,100	300,000	263,300
Kentucky	20,850	2,200	25,500	22,650
Louisiana	360,625	27,000	375,000	355,850
North Louisiana	82,125	.....	.....	82,350
Louisiana Gulf Coast	278,500	.....	.....	273,500
Michigan	59,100	100	60,100	56,900
Mississippi	49,155	.....	50,000	51,650
Montana	21,570	300	23,300	23,645
Nebraska	1,800	.....	2,000	1,850
New Mexico	105,100	5,400	116,600	105,150
Oklahoma	327,200	27,000	347,000	324,950
Texas	1,832,350	116,000	1,909,000	1,780,550
East Texas	380,000	.....	.....	376,150
West Texas	332,500	.....	.....	300,800
North Central Texas	140,600	.....	.....	140,500
East Central Texas	130,200	.....	.....	130,100
Texas Panhandle	104,000	.....	.....	101,400
Texas Gulf Coast	651,000	.....	.....	639,950
Southwest Texas	94,050	.....	.....	91,650
Wyoming	99,955	2,000	98,800	96,875
Total United States	4,339,615	253,900	4,552,100	4,244,870

Total production January 1-September 11, 1943 ..... 1,014,767,200 bbl.
Same period last year ..... 961,624,750 bbl.

EASTERN TEXAS

New Pool in Prospect Northeast of Quitman

DALLAS, Tex.—Jackson & Fisher 1-A McCorley, twin well to a lost hole in the Hazard Anderson Survey, 5 miles north and east of Quitman, gave promise of opening a new pool in Wood County when it was showing oil from the sub-Clarksville formation while drilling at 5,036 ft. The test topped the sub-Clarksville at 4,978 ft., and a core from 4,981-85 ft. recovered 4 ft. of silty sand and shale with pin points of oil and a few streaks of bleeding shale. Another core from 5,013-23 ft. recovered 8 ft. of ashy shale and sand showing oil, and some silty sand with good oil stains and odor. A drill-stem test from 5,018-25 ft. open 15 minutes with ¼-in. choke on bottom had steady blow of air and showed 2,700 ft. oil-cut mud. Another drill-stem test from 5,019-36 ft. with ¼-in. choke on bottom open 15 minutes

and blow of air and showed 120 ft. oil-cut mud with brackish taste and 1,080 ft. of muddy salt water with slight show of oil. The first test, which lost the hole with total depth of 7,506 ft., had show of oil in cuttings from 4,950-5,060 ft., and started a spirited lease and ropalty play in the area, but operators decided to carry the test to the Paluxy and try for bigger production. After the attempt was a failure, and a plugback was tried, the hole was lost on account of mechanical trouble and a new hole was made.

Hunt County.—Stanolind Oil & Gas 1 Bickley, Lindsey Survey, topped Glenrose at 5,180 ft., and was shut down at a total depth of 5,665 ft. in sand.

OHIO, KENTUCKY

South Wayne Gas Field Extended by Record Well

ZANESVILLE, Ohio. — The south Wayne gas pool was extended ½ mile to the south by one of the largest wells ever completed in Muskingum County. The completion was by the Ohio Fuel on the Henry Stelzer farm in Section 2, Wayne Township, and gaged 14,364,000 cu. ft. from the Clinton sand at 3,978-4,031 ft. A smaller well was also completed in the same pool, one well is drilling and five additional locations have been approved.

Leasing activity north and south of Zanesville is spreading with large blocks of acreage being taken extending to the north part of Coshocton County.

The Industrial Gas completed a 3,210,000-cu. ft. well on the Epply tract in York Township, Morgan County, at the south end of the Brush Creek field. Three wells are now drilling up to 2 miles south of the field.

OHIO WILDCAT COMPLETIONS

Holmes County, Killbuck Township: Kemrow Co. 1 Edith Hoxworth, Sec. 20, Clinton, 3,234-52 ft., dry, T.D. 3,267 ft.
Muskingum County, Brush Creek Township: Lupher 1 Elmer Mautz, Section 19, Clinton 3,997-4,032 ft., dry, T.D. 4,135 ft.

INDIANA

EVANSVILLE, Ind. — Three new oil wells and four dry holes were reported from southwestern Indiana fields in the past week. One of the producers opened a pool in Posey County. It was A. C. Thomas, Bennett Brothers and E. E. Beatty's 1 F. L. Bailey, NW SW SE 28-4s-13w, which pumped an initial production of 155 bbl. of oil, without a shot, from Waltersburg sand at 2,194-2,207 ft., T.D. 2,215 ft.

INDIANA WILDCAT COMPLETIONS

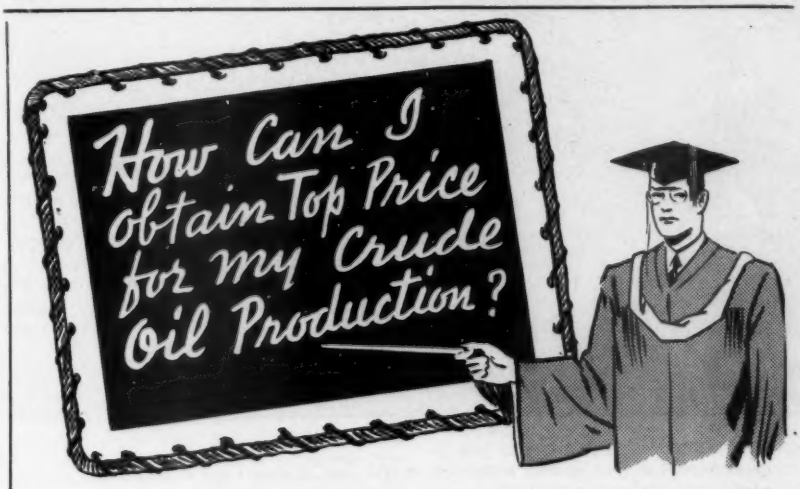
Daviess County: S. W. Mitchell 1 Isom Ross, SE SE NE 32-2n-7w, dry at 1,103 ft.
Posey County: Thomas, Bennett Bros. and Beatty 1 F. L. Bailey, NW SW SE 28-4s-14w, pumped 155 bbl., Waltersburg sand at 2,194-2,207 ft., T.D. 2,215 ft.

WESTERN KENTUCKY

OWENSBORO, Ky. — Sun Oil Co. completed a relatively large McClosky sand well in Union County, its 1 Byron Tapp, which flowed and pumped 466 bbl. of oil in 12 hours from pay at 2,509-15 ft. and 2,538-47 ft., T.D. 2,552 ft. Benedum & Trees have a promising wildcat in 1 City property, in Uniontown, which had a good showing in the Waltersburg sand. Kingwood Oil Co.'s wildcat, 1 A. F. Lilly, ¼ mile southwest of Morganfield, in Union County, was completed in McClosky lime but its initial production was 15 bbl. of oil and 7 bbl. of salt water.

In Webster County, near the town of Clay, W. R. White et al found about 15 ft. of saturation in Palestine sand at 1,227 ft and a test indicated the well might be good for 25 bbl. per day, or more. Sand lies at 1,227-38 ft., and preparations were being made to shoot it. The well is 10 miles from other production.

The best well completed thus far in the St. Vincent pool in Union County is Sohio Oil Co. 2 Hancock, which, after a 5,000-gal. acid treatment last week, flowed 1,494 bbl. of oil in 24 hours from Levias lime (lower O'Hara) at 2,525-31 ft. and Mc-



You can obtain "top price" for your crude oil production by making lease storage tanks vapor-tight and installing the ENARDO Vapor Control System.

The ENARDO System equalizes storage tank vapors so as to exclude excessive outside air . . . to prevent undue waste of rich condensible vapors . . . and to conserve volume.

ENARDO EQUIPMENT on your tankage results in a definite saving.

2729 Sand Springs Road . . . . . Tulsa, Oklahoma . . . . . Phone 4-8131

ENARDO Foundry and Mfg. Co.
TULSA, OKLA.

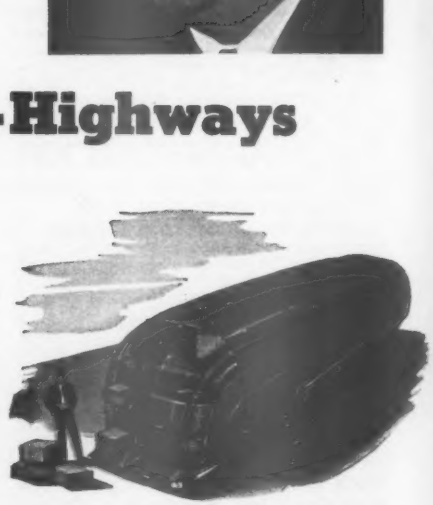
Front as well as rear loading, better load distribution, tandem front driving axles, plastic windshields, periscope rear vision, are only a few of the possibilities for progress in transport after Victory, according to Lurelle Guild, noted New York industrial designer, creator of the "Truck of the Future" pictured above. Mr. Guild says American Motor Vehicle Manufacturers will show the way.

Super-Transport on Super-Highways

Today motor transportation progress is concentrated on the development of superior military vehicles — with specialized axles and brakes by Timken playing a leading role.

As for tomorrow, regardless of the size, shape or design of the trucks and buses produced by America's great manufacturers, axles must *carry* the load, *move* the load, *stop* the load. And Timken will be ready with improved axles and brakes that will do the job better and more economically in the long run.

Now, 'til Victory, take care of your trucks and buses! We'll help you — by furnishing complete Axle Maintenance aids, including the showing of a full-color sound film on "Teamwork" to your organization, on request.



For a better world tomorrow, buy War Savings Bonds today.

ARMY NAVY

For Production "Well Done"

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT, MICHIGAN

WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN

Closky lime at 2,556-58 ft., total depth 2,580 ft.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Henderson County: Sohio 1 H. J. Knight, 4 mi. NE of Robards, dry at 2,576 ft., Benoist sand 2,259 ft., lower Renault 2,293 ft., Ste. Genevieve 2,346 ft., McClosky 2,423-26 ft., 2,457-63 ft., 2,507-11 ft. and 2,558-61 ft.

Union County: Kingwood 1 Lilly, ¼ mi. SW of Morganfield, pumped 15 bbl. oil and 7 bbl. water, McClosky lime 2,703-06 ft., T.D. 2,802 ft.

SOUTHWEST TEXAS

Two New Productive Areas Found in Bee County

CORPUS CHRISTI, Tex.—Bee County, whose wildcat operations have been a center of rising interst, invited a still larger share of attention this week with reports of three completions, two of them successful. Mackhank Petroleum Co. 1 J. M. Freeland, on a 350-acre tract in the John Pace Survey, was finished at total depth of 7,516 ft., plugged back to 7,400 ft. and making around 3 bbl. of distillate hourly through ¼-in. choke, with gas volume of 645,000 cu. ft. daily. This well, at the edge of the old Cosden field, opens a new Wilcox horizon and has been named the Cosden (Wilcox) field. Pure Oil Co. 1 Nannie Tuttle, in the Michael O'Donnell Survey, is a gas discovery, making 1,500,000 cu. ft. daily. The well is 2 miles southwest of Blanconia, and the name Blanconia has been given to the pool. Hewitt & Daugherty 1 J. H. O'Connor was a dry hole.

WILDCAT COMPLETIONS
Lower Gulf Coast

Bee County: Hewitt & Daugherty 1 J. H. O'Connor, 7 mi. W of Beeville, dry at 5,186 ft.

Mackhank Oil Co. 1 J. M. Freeland, John Pace Sur., 72 bbl. distillate, with 645,000 cu. ft. gas, through ¼-in. choke, T.P. 2,325 lb., S.I. C.P. 2,455 ft., T.D. 7,516 ft., P.B. 7,400 ft. Discovery, named Cosden (Wilcox) field.

Pure 1 Nannie Tuttle, 2 mi. SW of Blanconia, 1,500,000 cu. ft. gas through ⅛-in. choke, T.P. 1,850 lb., T.D. 5,605 ft., P.B. 4,940 ft. Gas discovery, named Blanconia field.

Jim Wells County: Kilgore Developers 2 Weldon et al, 4 mi. SW of Gallagher field, dry at 5,130 ft.

Karnes County: Blanco Oil Co. and Buchanan 1 C. O. Carlson, 3 mi. W of Green, dry at 6,294 ft.

Sunray 1 H. A. Discher, 2 mi. NE of Hondo Creek, dry at 7,703 ft.

South Texas

Starr County: Continental 1 William Cameron, 2 mi. NE of Rincon field, 225 bbl. through ⅛-in. choke, T.P. 900 lb., C.P. 1,300 lb., gas-oil ratio 736, perf. 4,140-50 ft., T.D. 5,005 ft. Discovery, named Cameron field.

South Central Texas

Milam County: Standard Oil Co. of Texas 1 Calvert Smith, 2½ mi. NW of Gause, dry at 5,838 ft.

N. CENTRAL TEXAS

Pools Extended in Clay And Wichita Counties

WICHITA FALLS, Tex.—Extensions for two new pools featured the developments in North Texas during the past year. In Clay County's Burns-Midway-Mississippi lime pool, L. T. Burns 2 M. M. Lyles, 500 ft. from north, 434 ft. from east lines of Block 30, Webb subdivision of San Augustine County School Land, west offset to the discovery well drilled by the same operator, flowed 260 bbl. oil in 3 hours thrrough ¾-in. tubing choke with casing pressure of 400 lb. from Mississippi lime. Total depth of the extension well is 6,064 ft.

In Wichita County Continental Oil Co. 2 G. T. West, 5,912 ft. from north, 330 ft. from east of G. W. Scott Survey, 1½ miles west of Wichita Falls, south offset to the Strawn sand discovery by the same company, flowed 108 bbl. of oil in 24 hours from sand pay at 4,229-37 ft., total depth. The flow was made through 12/54-in. choke on tubing, with casing pressure of 250 lb. and tubing pressure of 200 lb.

The Throckmorton County discovery prospects were attempting to complete as producers from the Caddo lime. Anderson-Prichard Oil Corp. and Bruce Sullivan 1-A J. M. Batchler, Section 1691 T.E.&L. Survey, 10 miles northeast of Woodson on the Young County line, was rigging up pumping unit after acidizing Caddo lime pay 4,288-4,311 ft. with 500 gal. The same operator's T. A. Wagoner, Section 775, T.E.L. Survey, total depth 4,938 ft. in dry Ellenburger lime, plugged back to the Caddo topped at 4,093 ft. with oil showings from 4,093-4,102 ft. for completion attempt. Top of Mississippi lime was called 4,695 ft.

WILDCAT COMPLETIONS
North Texas

Archer County: L. T. Burns 1 J. B. Frerich, 1,500 ft. from S 1,000 ft. from W. Sec. 106, Blk. 4, Clark & Plumb Subdivision, dry, T.D. 6,006 ft.

J. R. Craig 1 Jas. Levy, 200 ft. from S, 1,000 ft. from W, 100-ac. tract, C. K. Simmons Sur., dry, T.D. 1,211 ft.

G. E. Kadane & Sons 1 J. R. Parkey, Sec. 1, S. P. Ry. Co. Sur., dry, T.D. 5,012 ft. K.M.A. lime 4,070 ft., SSO 4,340-75 ft., Ellenberger 4,912 ft.

W. T. Hutcheson Jr. 1 Anton Wolf, 600 ft. from N, 200 ft. from W, 40-acre tract, Sec. 83, Blk. 4, Clark & Plumb Subdivision, dry, T.D. 1,066 ft., dry sand 809-20 ft., Gunsight 975 ft.

Clay County: Fortex Oil 1 Mrs. Eula Turner, 600 ft. from N, 850 ft. from W, Blk 55, Specht & McCutcheon Subdivision, dry, T.D. 1,252 ft.

West Central Texas

Brown County: Julian E. Simon 1 T. W. Steel, Sec. 32, B. B. B. & C. Ry. Sur., dry, T.D. 939 ft.

Callahan County: Great Lakes Carbon 1 T. A. Irvin, SE SE NE Sec. 349, G. W. Denton Sur., dry, T. D. 3,500 ft.

Comanche County: R. H. Roark 1 J. B. Hodges, 400 ft. from N, 1,720 ft. from W, S½ Sec. 3, Blk. 2, H. & T. C. Ry. Sur., dry, T.D. 2,915 ft.

Jones County: Louis F. Green 1 Green, 1,000 ft. from E, 825 ft. from S, Sec. 10, Lot 3, C. Allen Sur., dry, T.D. 1,860 ft.

H. G. Neely 1 Ethel Calvert, 330 ft. from S & W, 71-ac. tract, G. Martinez Sur., ½ mi. NW of Hawley, dry, T.D. 2,310 ft.

Taylor County: H. R. Roark 1 Ewell Jones, 400 ft. from S, 2,411 ft. from W, Blk. 6, Cozart Subdivision, dry, T.D. 2,910 ft.

TEXAS GULF COAST

Fire Follows Blowout in Old Well at Lovell Lake

HOUSTON, Tex.—Fire, resulting from a blowout, at Humble Oil & Refining Co. 1 Todd, in the Lovell Lake field, Jefferson County, was still burning as the week closed. The well, which had been producing for 5 years, went dead when the tubing sanded up. In order to kill the well, with a view of pulling the tubing, mud was being pumped into the casing to fill the annular space outside the tubing, when there was a failure. Tubing, casing and rocks were blown from the hole. Sand, shale, soil and rocks hurled from the hole have formed a rim about 10 ft. high around the crater, which is about 100 ft. in diameter. Humble 1 Steinhagen, an offset to 1 Todd, was rigged up, and it is drilling a directional hole toward the bottom of the Todd well. It is planned to pump mud through this deflected hole and thus kill the burning well. Some of the oil spurting from the wild well was saved, but thousands of barrels of it was lost. Depth of the Todd well was 7,719 ft.

Fort Bend County.—A five-hour production test was made at Phillips Petroleum Co. 3 Robinson, in the Blue Ridge field area, with perforations at 4,105-09 ft., through ¼-in. choke at the bottom and 11/64-in. choke at the top. The test, which showed 20-lb. pressure, recovered 800 ft. of oil and oily mud. The chokes sanded up. The crew pulled the tool, washed the well, and at the weekend was running 2½-in. tubing. The hole is at total depth of 4,480 ft. in shale.

Wharton County.—The 1 Claude Appling, wildcat test of W. Stewart Boyle et al, a mile west of Louise, was flowing into pits last week through 6/64-in. choke, making gas, with an occasional small show of oil. Tubing pressure was 1,275 ft. and casing pressure 1,360 ft. Total depth is 6,007 ft., plugged back to 4,095 ft.

TEXAS GULF COAST WILDCAT COMPLETIONS

Colorado County: Magnolia 1 Anderson Brothers, 1½ mi. SW of Chesterville, dual completion; perf. 9,500-40 ft. 88 bbl. distillate through ¼-in. and ⅜-in. chokes, T.P. 2,300 lb., gas-oil ratio 80,-500, gas volume 17,000,000 cu. ft. open flow; perf. 6,850-60 ft. 44 bbl. distillate

through ¼-in. choke, C.P. 2,370 lb., gas-oil ratio 131,000, gas volume 35,000,000 cu. ft.; T.D. 12,011 ft., P.B. 9,951 ft. Discovery.

Jackson County: Akron Production Co. 1 J. Weardon, 3 mi. N of Cordelle, dry at 5,324 ft.

British American 1 Four Way Ranch, I.&G.N. Sur., dry at 6,517 ft.

ROCKY MOUNTAIN

Elk Basin Production Extended to North

DENVER, Colo. — The Elk Basin field, which so far has not had a single failure in the Tensleep pay, although outposts have been drilled on all sides, maintained that record last week when the Stanolind Oil & Gas Co. 1 Dengler, SW NE 35-9s-23e, the most northerly well in the field, came in as a good producer. It is on the Montana side of the boundary, in Carbon County. It flowed 75 bbl. an hour from the Tensleep at 5,760 ft., total depth, through a 1-in. choke on the tubing, and had better saturation in the Embar, which was cased off with the 7-in. at 5,444 ft., than is normally found in that horizon in other parts of the field.

The top of the Tensleep, based on its tentative identification, is approximately 800 ft. below sea level, or around 65 ft. higher than in the Mule Creek 1 Watson, on the southwest flank, the deepest well structurally so far drilled in the field. It is located 3½ miles due north of the Watson well and 4 miles north and a little west of the most southerly well. It had approximately 316 ft. of sand, its thickness being due largely to the fact that the formation dips at a 45° angle at that location. On account of the steep dips and the fact that the well is in a fault block, its outcome was watched with more than ordinary interest. The operation encountered numerous difficulties due to the steep dips and has been drilling for more than 6 months. It will require the drilling of three offsets by the Sinclair-Wyoming Oil Co., which has several hundred acres on the north side.

McGuiness Sunburst sand pool extended. — The McGuiness Sunburst sand pool in the north central part of the Cut Bank field was extended one location to the east in Glacier Production Co. 4 McGuiness unit, SE SE SW 5-35n-5w, which was drilled to determine the trend, and swabbed 22 bbl. in 16 hours. The unit is to the north and west of several gas wells in the Cut Bank sand. The first well in the C NW of Section 8 flowed 800 bbl. in 23 hours. No. 2 McGuiness unit, ¾ mile north, made 840 bbl. the first 24 hours. No. 3, ½ mile north of No. 2, was much smaller and made only 66 bbl. the first 24 hours on a swabbing test. No. 4 was then drilled east of the second well with the results noted above. Location has been made for No. 5 a mile to the north of No. 3.

Pump test at Pendroy discovery.— Jarvis & Taylor 1 Goggin, C NE SE 7-27n-5w, Pendroy district, Teton County, Montana, reported a discovery last week in the top of the Madison lime at 2,542-51 ft., is being given a pumping test before deciding whether it will be carried on down to the Devonian, its original objective. It was making 25 bbl. of oil and 50 bbl. of water per day, estimated, at the beginning of the test, and efforts will be made to reduce the water and increase the oil before further drilling is attempted.

Tribal leases bring high bids.—Sale of oil and gas leases on 770 acres of Blackfeet Indian land at the south end of the Cut Bank field at Browning on August 31 brought an average of $184 an acre, or a total of $141,840. Some of the acreage is within less than a mile of two wells brought in early this year by the Texas Co. in 31-32n-5w, which made 300 and 335 bbl., respectively, initial production and extended the proven area to the south. Fred Goodstein, of Casper, was high bidder at $240 per acre for 270 acres in NW N½ N½ NE SW 6-31n-5w, George Champagne allotment. Goodstein also acquired 320 acres in E½ 6-31n-5w at $202 an acre, and the British-American Oil Producing Co. was high bidder at $130 an acre for 280 acres in NW NW S½ NW and SW of Section 5.

Deep test at Big Hollow. — Ricgar Oil Co. (Harry Metzgar et al) had a 2-bbl. well in the Muddy sand at 895 ft. in 1 Fuller, NW NE NE 7-15n-75w, Big Hollow district, Albany County, Wyoming. While not commercial, it showed that the location was 44 ft. higher structurally than any other wildcat in the district, and a heavier rig will be moved in to carry the test on down to the Tensleep.

WILDCAT COMPLETIONS

Montana

Dunkirk, Toole County: Texas Co. 1 Wallace, trustee, NE SW NW 29-32n-1e, T.D. 1,590 ft., top Madison 1,586 ft., sulfur water rose 216 ft. in 24 hr., will plug and abandon.

East Kevin-Sunburst, Toole County: Northern Ordnance, Inc., 1 Overby, C SW SW 34-35n-1e, T.D. 1,806 ft., water in Sunburst at 1,521-45 ft., show of oil in basal Ellis sand at 1,761-85 ft., top of Madison 1,785 ft., plugged and abandoned.

Pondera Block, Pondera County: Northern Ordnance, Inc., 1 Jannusch, C NE SE 13-28n-7w, T.D. 3,761 ft., sulfur water in Madison, plugged and abandoned.

LOUISIANA GULF

New Field Opened in East Baton Rouge Parish

NEW ORLEANS, La. — Shamrock Oil Co. 1 L. B. Phillips, Hallett's Bluff area wildcat in East Baton Rouge Parish, seems to have cinched its place in the discovery column by making 300 bbl. of oil through 5/32-in. choke on the first 24-hour gage to which it had been subjected. Tubing pressure was 1,000 lb. and casing pressure 1,050 lb. Seventeen barrels of wash water and drilling mud accompanied the oil. On a 23½-hour test which followed, with choke and pressures the same, the well flowed 310

LADISH

Quality (L) Fittings

TO MARK PROGRESS

ARMY E NAVY

FITTINGS DIVISION

LADISH DROP FORGE CO.

CUDAHY [MILWAUKEE SUBURB] WISCONSIN

HOW TO BRING YOUR LIST OF REFINERY AND NATURAL-GASOLINE PLANT PERSONNEL UP-TO-DATE

The Oil and Gas Journal's new Survey of Refineries and Natural-Gasoline Plants—just off the press—will give you the names and addresses of hundreds of NEW executives (from presidents down to foremen) in this field. In addition there are complete lists (by states) of both the active and shut-down plants, showing their input and output capacities, type of products manufactured. It's a buy at

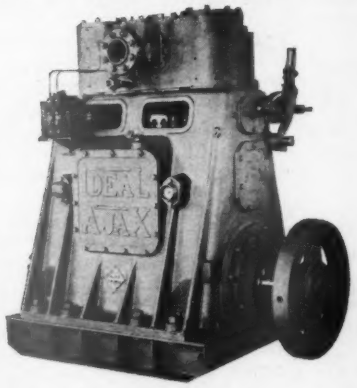
$5 A COPY

Send your order and remittance to THE OIL AND GAS JOURNAL, Tulsa 1, Okla.

STEAM DRIVES ON TO VICTORY!

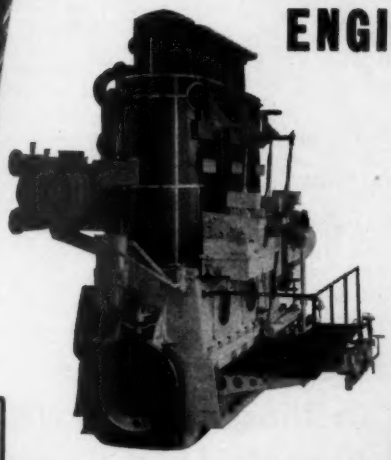
AJAX

Steam DRILLING ENGINES



Powerful, dependable and economical Ajax Steam Drilling Engines are doing an outstanding job in releasing virgin crude oils for fighting duty on United Nations' fronts.

MARINE ENGINES



On the seas with U. S. Maritime Shipping, the Ajax specially designed Marine Compound Uniflow Steam Engine is contributing dependable performance for a quicker victory.

AJAX ENGINES

The exceptional ingenuity and correctness of Ajax designed steam engines are responsible for the widespread confidence they enjoy wherever steam power is required. And Ajax continues to merit this confidence by delivering unmatched dependability and continuous power—faster, better, and cheaper!

Manufactured Exclusively by

AJAX IRON WORKS
CORRY, PENNA.

Distributed by
THE NATIONAL SUPPLY COMPANIES IN EVERY FIELD

bbl. of fluid, of which 295 bbl. was oil and 15 bbl. wash water and drilling mud. Estimated gas-oil ratio was 400 The well was to be shut in to await storage. Its total depth is 9,874 ft., plugged back to 9,591 ft.

Continental Oil Co. et al made a 1-hour drill-stem test of 1 Adolph Hebert, Jr., in the Big Lake area of Cameron Parish, after setting cement plug at 9,700 ft. and drilling out to 9,535 ft. The test was of a sand section at 9,506-20 ft. in open hole, with packer at 9,465 ft., 4,000-ft. water cushion, and ¼-in. chokes at top and bottom. No working pressure was reported. The crew pulled tool and recovered drilling mud, gas, and a slight trace of distillate. Bottom-hole flowing pressure was 4,600 lb. Retainer was set at 9,397 ft. and preparations were begun to perforate and test. Magnolia Petroleum Co. recovered a drill collar and bit lost in 1 R. A. Moore, 3 miles east of the Black Bayou field, Cameron Parish, and was drilling at 8,564 ft. in shale. Pure Oil Co. was at 8,203 ft. in shale and lime at State 549-Snake Lake 1, 9,500-ft. test in the East Grand Lake area of Cameron Parish.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Acadia Parish: Amerada 1 Clarence D. Daigle, 75-7s-3e, 149 bbl. distillate and 2,558,000 cu. ft. gas through 5/32-in. choke, T.P. 3,550 lb., gas-oil ratio 14,846, perf. 10,338-53 ft., T.D. 10,501 ft., P.B. 10,357 ft. Discovery.

MICHIGAN

Three Good Producers Found in New Fields

SAGINAW, Mich. — Three fairly heavy producers marked activities of the past week in Michigan oil fields as operators reported 17 completions. Sohio Producing Co. reported initial flow of 979 bbl. a day from its 1 Bowker in Section 31 of Rose Lake Township, Osceola County, drilled to 3,181 ft. Smith Petroleum 1 Winchester estate, Section 7, Fork Township, Mecota County, flowed 290 bbl., pinched the first 16 hr., and in Section 8 of Goodwell Township, Newaygo County, Pure Oil Co. 1 Troeger produced 360 bbl. the first 16 hr. after acid treatment. Two other oil producers, small wells in Bay and Van Buren Counties, and two more natural gas completions by Taggart Brothers Co. in Summerfield Township, Clare County, also were developed.

Of the 10 dry holes 6 were wildcat tests in widely scattered sections of the state. New drilling activity declined, the state Conservation Department reporting only 7 new permits issued.

WILDCAT COMPLETIONS

Arenac County, Lincoln Township: Ervin Major 1 Walter Pula, NW NE 19-18n-4e, dry in Monroe, T.D. 3,045 ft.

Isabella County, Sherman Township: Gordon Oil Co. 1 Milo and Mable Gingrich, W½ NW NE 7-15n-6w, dry in Monroe, T.D. 3,780 ft.

Manistee County, Norman Township: Franklin Petroleum Development Co. 1 Charles A. Beebe, N½ SW NW 34-21n-14w, dry in Monroe, T.D. 2,625 ft.

Mecosta County, Martiny Township: Gordon Oil Co. 1 C. A. Bush, NE SE 14-15n-8w, dry in Dundee, T.D. 3,815 ft.

Osceola County, Lincoln Township: James E. Flanigan 1 M. Curtis, N½ SW SE 28-18n-10w, dry at 1,705 ft.

Van Buren County, Bangor Township: Roung & Clark 1 Mark Hessey, NE NE NW 8-2s-16w, dry in Traverse, T.D. 1,049 ft.

Wayne County, Huron Township: Voorhees Drilling Co. 1 Dennis Poet, NE SW SW 6-4s-9e, dry in Trenton, T.D. 2,843 ft.

APPALACHIAN FIELDS

Drilling for Gas More Profitable Than for Oil

PITTSBURGH, Pa. — Completions are increasing throughout the lower eastern fields and except in Southeast Ohio are chiefly in gas territory due to the expected continued industrial gas demand and the great possibilities of a shortage. Moreover, returns on investment in gas wells are more attractive and will so continue until an increase in Penna Grade crude price structure reverses the trend. The time lag is so great between starting drilling programs and the resultant production that eastern operators feel that a nominal increase now will be useless.

In South Union Township, Fayette County, New Penn Development Co. and William E. Snee et al are building the rig to deepen 3 Heyn (Summit Hotel) in the Helderberg. The results underlying the Oriskany in 1 Heyn have been so satisfactory in discovering a producing formation in the Helderberg or possibly the top of the Silurian that other wells will be tested whenever conditions permit. No. 1 Heyn is putting more gas in the line from this formation than appeared in the open flow test. It was permitted to rock up to 1,500 lb.

WEST VIRGINIA

Wood County.—Both the Oriskany tests in Slate district, Wood County, United Natural Gas Co. as 5263 F. R. Hart and 5264 J. A. Goudy were shot through the Oriskany sand and were dry. The Hart test, with the Oriskany placed at 4,841-82 ft., will now be plugged back to shoot the brown shale. The Goudy test had the Oriskany at 5,326-68 ft.

Boone County. — In Peytona district, Boone County, Owens, Libby-Owens topped the White Medina at 5,484 ft. in the test on the Coal River Mining Co. and is drilling at 5,492 ft. The Medina is so far dry.

Save Critical Materials — Lessen Drilling Grief—with Acme's Mud Collar

Makers of the world famous "Drilmor" Line of Drilling and Fishing Tools for Cable Drillers - the Highest Standard of Quality Since 1900

ACME DRILLING & FISHING TOOLS

There are few Mud Collars in stock. You know the difficulties of obtaining *critical materials*. And, too, Acme's now in war production. So, don't delay placing your Mud Collar order—as deliveries from *new stock* cannot be promised for "the duration."

Here's what Acme's Mud Collar can do for you—as proven by satisfied users—in any formation:

It lessens drill pipe torque; assures faster, easier cutting, longer runs, fewer "green bits" and makes better hole . . . Its 6 high-velocity fluid streams keep cutters clean, bit bearings "lubricated" and free of cuttings—while constantly flushing bottom . . . In sticky formation, it also prevents mud rings and "balled up" bits.

Decrease material purchases by increasing the life of bits and drill pipe. Learn how—with this "wonder tool." Write TODAY for full information. *And don't delay your order.*

(Also ask for Catalog No. 12. It gives valuable information on correct use and care of Acme cable tools.)

With Acme's facilities largely devoted to war production, Defense comes FIRST! But we'll serve YOU as best and long as we can—and *in a friendly fashion.*

ACME FISHING TOOL CO.
Parkersburg, W. Va. U.S.A.
Export Office — 19 Rector Street, New York, N. Y.

OKLAHOMA

Wildcats Open One Pool And Extend Two Areas

WILDCAT operations in the state last week included the completion of two small oil wells and one gas well. In the northeast corner of the Cushing area of Creek County Dunn-Miller 1 Bear Tail was pumping 11 bbl. in the Skinner sand at 2,522-43 ft. and the Red Fork sand at 2,635-61 ft. In Cleveland County, Atlantic Refining Co. 1 Muck, 4 miles west of the Moore pool, and east of the town of Moore, flowed 29 bbl. in Hunton at 5,110-56 ft. The gas well was Mid-Continent Petroleum Corp. 1 Cline, a southwest extension to the Elgin area in Comanche County. While this new pool has produced only small wells, in both oil and gas sands, it is a shallow area and development has progressed rapidly over the past few months. Gas sand at the 1 Cline was found at 980-1,032 ft.

While activity in the northwest end of Pauls Valley is increasing steadily, two wells were showing as failures at the end of the week. Phillips Petroleum Co. 1 Mauldin, SE SE 31-4n-1e, may limit the field at the extreme eastern tip. On the last report the well was at 4,154 ft., had failed to flow and operators were swabbing. On the northeast side of the field, Sinclair Prairie 1 Patchell, SW NW 30-4n-1e, was expected to define the field in that direction It was last reported at 4,100 ft. and running low.

Deep wildcat is abandoned.—The Denver Producing & Refining Co. has announced plans to abandon its 10-year fight to make a producer at the 1 Sah-Cam, in SE SE 33-10n-10w, near Binger in Caddo County. At total depth of 13,882 ft. the well was estimated to be flowing 5,000-7,000 bbl. of hot water a day.

OKLAHOMA WILDCAT COMPLETIONS

Cleveland County: Atlantic Refining 1 Muck, NE NE SW 24-10n-3e, flowed 29 bbl., Hunton 5,110-56 ft., T.D. 5,511 ft.

Comanche County: SW extension to Elgin area Mid-Continent 1 Cline, SE NE NE 17-3n-10w, flowed 2,500,000 cu. ft. gas, 400 lb. S.I.P., gas sand 980-1,032 ft., T.D. 1,500 ft.

Creek County: Dunn-Miller 1 Bear Tail, SE SE SW 36-19-7e, pumped 11 bbl., Skinner sand 2,522-43 ft., Red Fork sand 2,635-61 ft., T.D., gravity 38; in NE corner of Cushing area.

Lincoln County: Magnolia Pet. 1 Walk, NE NE SE 13-13n-2e, dry, T.D. 4,931 ft., Layton 3,490 ft.

Pawnee County: Geo. Dicky and Big Chief Drlg. 1 Wichita, NW SW 33-21n-6e, dry, T.D. 3,257 ft., Simpson 3,216 ft., Wilcox 3,227 ft.

Jack Shaffer 1 Rogers, NW NW NW 13-22n-4e, dry, T.D. 3,444 ft., Layton 2,392 ft.

E. S. Adkins 1 Glenn, NE SW SW 14-22n-5e, dry, T.D. 3,621 ft., Wilcox 3,542 ft.

Seminole County: Ace Gutowsky 1 Madgett, NW NE NW 22-10n-5e, dry, T.D. 4,835 ft., Earlsboro 3,880 ft., Viola 4,742 ft., Wilcox 4,815 ft.

VICTORY SHIPS

O-C-T is helping to

KEEP 'EM SLIDING

Cargo ships . . . key to victory! Never before has the lowly tramp freighter played such an important role in warfare because never before has there been global war. The tremendous importance of our cargo vessels is reflected in the enemy's all-out U-boat warfare and the allies all-out war on the enemy's U-boat bases and yards.

To help speed the production of liberty ships, Oil Center long ago converted most of its facilities. New machining practices and metallurgy have helped us speed up production and exceed our quotas. This added "know how" is going to help us produce even better oil field equipment in the future . . . but victory first!

Here is a picture of machine shop ingenuity. It's a milling machine with special rigging designed by O-C-T engineers to expedite machining an odd-shaped part for cargo ships. Otherwise, this piece would have been machined as several separate parts, and welded together. Result: Precious man hours saved; maximum production from machine tools.

QUALITY O-C-T PRODUCTS — Selling Through Leading Supply Stores

OIL CENTER TOOL COMPANY

HOUSTON, TEXAS, U.S.A.

ILLINOIS

New McClosky Pools in Marion, Jefferson Counties

CENTRALIA, Ill. — Gulf Refining Co. opened two pools in the past week, one in Marion and the other in Jefferson County. The Marion County well, in Section 25-1n-3e, was completed for 155 bbl. per day. The wildcat in Jefferson County, in Section 23-1s-4e, was being completed. It produced 265 bbl. of oil in a 14-hour swabbing test. Both are McClosky lime producers.

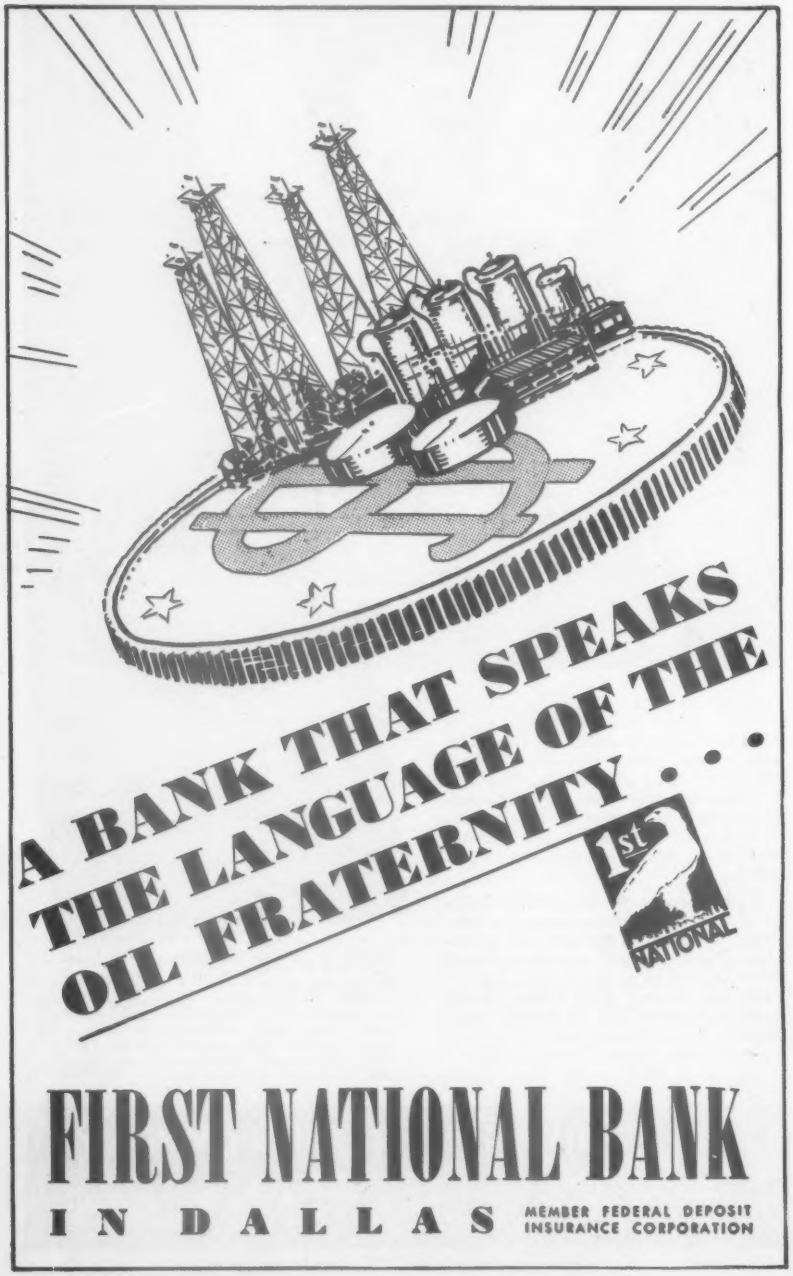
E. A. Obering opened a pool in Clay County with 1 J. H. McGee, in 30-5n-7e, good for 300 bbl. per day from McClosky lime.

E. S. Adams 1 Clayton, in 30-7s 3e, Franklin County, started at 151 bbl. per day from Tar Springs sand.

Cities Service 1 Vaught in 33-2s-9e, Wayne County, a wildcat, produced 209 bbl. initially from McClosky lime, after an acid treatment.

Thirty-nine new operations were reported during the week, including 10 wildcats as follows: Superior Oil Co. 1 Maggie Reid, SW NE NE 29-2s-14w, Wabash County; Robinson & Puckett 1 Gibson estate, C NE SE 3-4n-7e, Clay County; same operators 1 Little Flower, NE SE NE 27-1s-9e, Wayne County; Magnolia Petroleum Co. 1 E. White, C SW NE 25-1n-3e, Marion County; Dexter & Gilcrist 1 L. L. Hussinger, C NE SE 30-9n-9e, and, Sohio Oil Co. 1 Fred Wylde, SE SE NW 15-9n-9e, Cumberland County; George Allison 1 Huck, NE NE SE 8-8s-3e, Jackson County; W. L. Topp 1 Beasley & Way, SE SE NW 2-12n-6w, Macoupin County; Central Pipe Line Co. 1 Frank Gees, NW NE SW 35-11n-5w, Montgomery County; Eason et al 1 Rence, SE NE NE 16-4n-6w, Madison County.

Illinois oil production in August was estimated yesterday by the State Geological Survey at 6,703,000 bbl., slightly more than July's 6,700,000 bbls.


A BANK THAT SPEAKS THE LANGUAGE OF THE OIL FRATERNITY . . .
1st
NATIONAL
FIRST NATIONAL BANK
IN DALLAS
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

ILLINOIS WILDCAT COMPLETIONS

Clay County: E .A. Obering 1 John McGee, NE NE SW 30-5n-7e, 300 bbl., natural, McClosky lime 2,838-46 ft., T.D. 2,847 ft. Pool opener.

Clinton County: H. Luttrell 1 Nolting, NE NW NE 33-1n-1w, dry at 1,700 ft., Glen Dean lower 1,128 ft., Barlow 1,285 ft., Cypress 1,361 ft., Paint Creek lime 1,462 ft., Benoist 1,488 ft., Renault 1,539 and 1,553 ft., Ste. Genevieve 1,635 ft., Rosiclare 1,653 ft., Fredonia 1,680 ft.

Paul Mosebach 1 M. B. Skidmore, SE NE SE 29-3n-2w, dry at 2,679 ft., lower Glen Dean 900 ft., Golconda 970 ft., Barlow 1,036 ft., Weiler 1,102 ft., Paint Creek lime 1,158 ft., Benoist 1,217 ft., Aux Vases 1,291 ft., Ste. Genevieve 1,339 ft., Louisiana 2,496 ft., Chattanooga 2,560 ft., Devonian 2,571 ft.

Franklin County: E. S. Adkins 1 Clayton-S, NW NW SW 30-7s-3e, pumped 151 bbl. Tar Srpings sand top 2,062 ft., T.D. 2,100 ft. Pool opener.

Marion County: Gulf 1 William Floyd, SE SE NW 25-1n-3e, pumped 155 bbl. oil and 14 bbl. water, McClosky lime 2,730-40, acid.

Richland County: Sohio 1 William T. Balmer, NE NW SW 6-3n-14w, dry at 3,350 ft., lower Glen Dean 2,676 ft., Hardinsburg 2,697 ft., Golconda 2,756 ft., Barlow 2,835 ft., Cypress 2,928 ft., Paint Creek lime 3,003 ft., Benoist 3,074 ft., Ste. Genevieve 3,203 ft., Fredonia 3,236 ft.

Wabash County: Haynes and Wolf Bros. 1 Calverly, NE NE SW 15-1s-13w, dry at 2,680 ft., Tar Springs 2,040 ft., Glen Dean 2,127 ft., Golconda 2,198 ft., Barlow 2,319 ft., Cypress 2,342 ft., Paint Creek 2,430 ft., Paint Creek sand 2,486 ft., Benoist 2,538 ft., Renault 2,568 ft., Aux Vases 2,595 ft., Ste. Genevieve 2,626 ft., McClosky 2,637 ft.

Wayne County: Cities Service 1 Vaught, C W½ SW NW 33-2s-9e, 209 bbl., McClosky lime 3,290-93½ ft., acid., T.D. 3,294 ft.

White County: Sun 1 Hon-Langford, NW SE SW 19-4s-14w, dry at 3,150 ft., Menard 2,248 and 2,275 ft., Vienna 2,386 ft., Tar Springs 2,398 and 2,419 ft., Glen Dean 2,480 and 2,506 ft., Golconda 2,589 ft., Barlow 2,711 ft., Cypress 2,754 ft., Paint Creek 2,858 ft., Benoist 2,880 ft., Renault 2,927 ft., Aux Vases 2,946 ft., Ste. Genevieve 3,019 ft., Fredonia 3,055 ft., McClosky 3,078-80 ft.

A. H. Anderson 1 S. F. Knight, SW SW NW 15-7s-9e, dry at 3,061 ft., upper Kincaid 1,975 ft., Menard 2,111, 2,151 and 2,191 ft., no Waltersburg, Vienna 2,250 ft., Tar Springs 2,273 ft., Glen Dean 2,386 ft., Golconda 2,474 ft., Barlow 2,596 ft., Cypress 2,617 ft., Weiler 2,634 ft., Paint Creek lime 2,701 ft., Paint Creek sand 2,753 ft., Benoist 2,764 ft., Benoist sand 2,803 ft., Renault 2,819 and 2,874 ft., Aux Vases 2,884 ft., Ste. Genevieve 2,904 ft., McClosky 2,960-65 ft. and 3,008-11 ft.

CALIFORNIA

New Gas Area Opened In Maderia County

LOS ANGELES, Calif. — Texas Co. appears to have discovered a new commercial gas field in Madera County about 9 miles northwest of the Mendota gas field which Texas discovered last March, although the potential discovery well, 1 Moffatt in 7-12s-15e, is not officially completed. On a formation test at 3,960-73 ft. this wildcat flowed dry gas at a daily rate of 8,000,000 cu. ft. and showed a bottom-hole pressure of 2,075 lb. The company was not content to finish the wildcat as a commercial producer at 3,973 ft. and is accordingly drilling ahead.

In the Mendota discovery the top of the Eocene was placed at 4,419 ft. and top of the Cretaceous at 5,100 ft. It is therefore logical to assume that the gas sand found in the Firebaugh district of Madera County may be the equivalent of the upper zone existing at Mendota and if this is the case it is of probable Eocene age. The decision to resume drilling operations in 1 Moffatt is to determine if conditions at Firebaugh are comparable with those at Mendota and whether the oil sand at Mendota exists at Firebaugh as well as to determine the status of the second gas zone found at Mendota.

Other gas fields. — The search for commercially productive gas fields has shown a consistent increase during the present year and in addition to the gas field found by Texas at Mendota and the probable gas field near Firebaugh discoveries have been made this year at Lodi in San Joaquin County by Amerada and in the Thornton district of Sacramento County by Amerada. There is a possibility of a second gas field west of Lodi but the limited drilling to date has not shed much light on geological conditions existing between two productive areas. These new discoveries during 1943 and the discovery of a new deeper productive gas zone in the Rio Vista gas field have increased gas reserves in contrast with crude-oil reserves which are being drastically reduced and which have been on the down grade for over 3 years. The search for new gas fields goes on in various localities and in a number of counties, especially in the central part of the state.

Superior Oil Co. may have a new gas field up in the Hamilton district of Glenn County but it may take another well or two to definitely determine the region's productivity. Gas is known to exist in this area, however, as two gas wells were completed in the Willows district a few years ago. Superior's 1 Knight in 3-21n-2w showed a good gas blow from 3,600 ft. but drilling was continued to 6,346 ft. in search of deeper oil or gas. This wildcat is probably good for around 8,000,000 cu. ft. daily. Superior recently staked location for a second test to be drilled on Glenn Community lease No. 3 about 6 miles southeast of the original hole in 31-21n-1w.

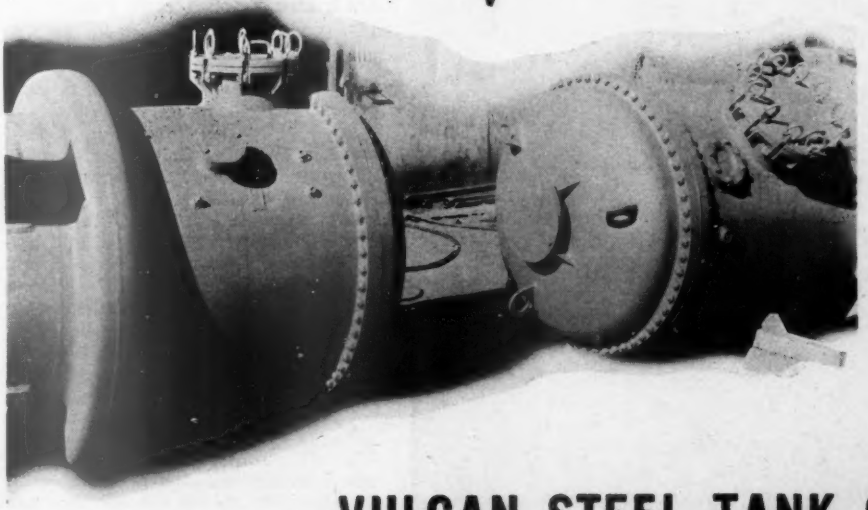
Kern County. — Western Gulf successfully completed 36-1 Los Angeles Athletic Club in the Paloma distillate field and secured a production of black oil as had been anticipated from core analyses. This new completion showed an initial daily production of only 169 bbl., but may build up after it has been on production for another several days. The oil from this well, the second to produce a normal black crude oil, tests 29.9° A.P.I. and shows a cut of less than 1 per cent. This well is located in the eastern end of the field but west of the Symons well of Western Gulf completed last year.

The Paloma unit plan which now includes in addition to Western Gulf, Texas, and Ohio Oil Co. the Barnsdall Oil Co., General Petroleum Corp. and Union Oil Co. has become an operating unit and has already spudded one well and will soon start four more holes. The Paloma Operators Committee recently received permission to

(Continued on page 98)

NATURAL GASOLINE
CHEMICAL AND
OIL REFINERY VESSELS

VULCAN



All Materials and Workmanship according to ASME or API Requirements as specified.

See
REFINERY
COMPOSITE CATALOG
Pages 543 to 544

VULCAN STEEL TANK CORPORATION

TULSA, OKLAHOMA

PLANT: North Harvard & Frisco R.R. Telephone 5-2101

KANSAS

Discoveries and Extensions Are Week's Developments

WILDCATTERS were active again in Kansas last week. Two new pools were reported and 2 extensions given to producing areas.

Ellis County.—In the southeast corner of the county, Coralena Oil Co. 1 Bacon-Beeching, NE NE SE 34-15-16w, was given state potential of 806 bbl. of oil daily in Lansing-Kansas City lime at 3,150-3,200 ft. Nearest major production is the Trapp pool, some 12 miles to the east.

Graham County.—Two miles southeast of the Morel pool, Hollow Drilling Co. 1 Fesler, NW NW NW 25-9-21w, was a prospective pool opener in the Arbuckle dolomite. It flowed 7 bbl. of oil an hour before acid treatment and after acidizing made 28 bbl. of oil in 35 minutes. More complete details as to the producing depth were not reported.

McPherson County.—Another well showing for a producer in the Mississippian chat, and extending the Canton North pool ½ mile to the south, is W. C. McBride 1 Greenwood, N½ NW SW 36-18-1w.

Russell County.—A northeast extension to the Trapp pool and the first production between Trapp and Hall-Gurney, was brought in last week. Production tests had not been made but it was said to have had a hole full of oil from the Lansing lime. The well is Pryor & Lockhart 1 Flegler, S½ NE NW 11-15-14w.

KANSAS WILDCAT COMPLETIONS

Cowley County: Northern Ordnance 1 Lewis, NW NE SW 36-31-5e, dry, T.D. 3,120 ft., chat 3,064 ft., Mississippi 3,070 ft.

Ellis County: Phillips Pet. 1 Geschler, NE NE NE 23-12-20w, dry, T.D. 3,965 ft., Mississippi lime 3,536 ft., Arbuckle 3,935 ft.

Marion County: National Ref. 1 Hawks, NW NW SE 17-19-4e, dry, T.D. 2,758 ft. chat 2,357 ft., Viola 2,708 ft.

Pratt County: Cities Service 1 McGuire, SW SW SW 24-27-13w, dry T.D. 4,461 ft., Viola 4,272 ft., Arbuckle 4,431 ft.

Rice County: Phillips Pet. 1 Fair, NE SE NE 16-21-9w, dry, T.D. 3,546 ft., Viola 3,391 ft., Simpson 3,447 ft., Arbuckle 3,516 ft.

Falcon-Seaboard 1 Blackhall, W½ SW SE 7-21-8w, dry, T.D. 3,640 ft., Viola 3,490 ft., Simpson 3,525 ft., Arbuckle 3,607 ft.

Texon 1 Millard, SE SW SE 10-20-7w, dry, T. D. 3,616 ft., Viola 3,513 ft., Simpson 3,545 ft., Arbuckle 3,601 ft.

Rooks County: National Assoc. Pet 1 Riley, SE NE NE 16-7-17w, dry, T.D. 3,666 ft., Lansing 3,066 ft., Arbuckle 3,612 ft.

Russell County: Republic Nat. Gas 1 Anschutz, NW NW NW 35-14-11w, Lansing 2,788 ft., Arbuckle 3,202 ft.

Stafford County: Stanolind 1 Fred Hewitt, SE SE SW 4-21-12w, pumped 388 bbl., no water, Arbuckle 3,460-63 ft., T.D. 3,475 ft., P.B. 3,463 ft., gravity 40, corrected. Discovery of Byron pool.

MISSOURI COMPLETION

Caldwell County: J. N. Todd & E. Gottschall 1 Pollard, SW SE SE 19-55n-29w, dry, T.D. 920 ft.

NEBRASKA COMPLETION

Harlan County: Bell Oil & Gas 1 Batlin, NW SE 14-2n-18w, dry, T.D. 3,557 ft., Lansing 3,291 ft., Kansas City 3,363 ft.

COLUMBIAN
BOLTED STEEL TANKS

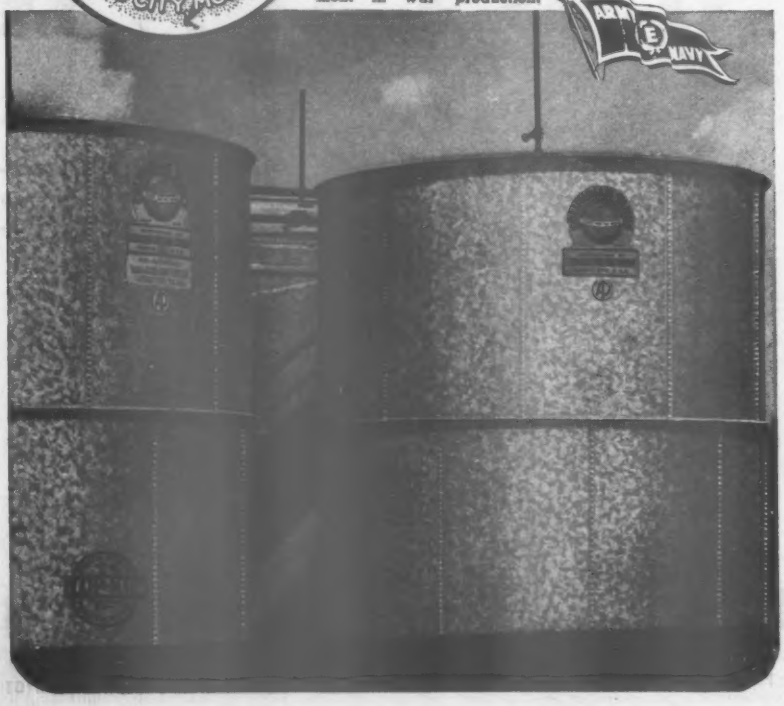
For 50 Years in Peace and War
COLUMBIAN STEEL TANK COMPANY
MANUFACTURERS
TANKS FOR THE WORLD
KANSAS CITY, MO. U.S.A.

COLUMBIAN produces war equipment to the exacting requirements of our armed forces. Columbian Bolted Steel Tanks are serving on the battlefronts of the world. Our war experience and increased facilities leave us even better equipped to serve America's great oil industry. Remember, Columbian Bolted Steel Tanks are available to oil producers.

COLUMBIAN STEEL TANK CO.
Kansas City, Mo.

. . . for outstanding achievement in war production.

ARMY NAVY



NORTH LOUISIANA

La Salle Parish Has Pool Well in the Wilcox Sand

SHREVEPORT, La.—George H. Echols' wildcat in NE SE 7-7n-4e, 3 miles east of the Nebo pool, opened another Wilcox field. Perforations made at 3,897-3,900 ft. resulted in a flow of 4 bbl. of oil an hour for 36 hours, when it started making 5 per cent salt water. Reperforated at 3,896-3,900 ft., it flowed an estimated 5 bbl. an hour through ⅛-in. choke. When turned into tanks the well made 105 bbl. of oil a day, through the ⅛-in. choke, cutting 13 per cent salt water. The well was completed for the 105-bbl. potential and shut in for storage tanks.

NORTH LOUISIANA WILDCAT COMPLETIONS

Sabine Parish: Seaport Oil Co. 1 R. J. Lucius, SW SW NE 4-5n-12w, dry, T.D. 3,182 ft., Midway 2,410 ft.

ARKANSAS WILDCAT COMPLETIONS

Calhoun County: Placid Oil 1 Morgan Co., SE SW 12-16s-14w, dry, T.D. 5,150 ft.

Ouachita County: McAlester Fuel Oil Co. 1 Walker, NE SW NW 16-14s-18w, dry, T.D. 4,573 ft., porous sand 1,867-74 ft.

MISSISSIPPI

JACKSON, Miss.—A new field has been opened by Love Petroleum Co. 2 J. R. Anderson, 4½ miles northeast of Flora, Madison County. The well, about 12 miles from proven production in Tinsley field, 2-8n-1w, was reported to be flowing about 20 bbl. of 33-gravity oil hourly through ¼-in. choke. Total depth is 4,344 ft. Union Producing Co. drilled a wildcat that had oil showings, and Love drilled a dry hole 1 mile to the southeast of the Anderson. Testing continued at Gulf Refining Co. 1 Aden Davis, 15 miles northeast of Laurel, in Wayne County, where favorable showings have been encountered. The well is bottomed at 7,100 ft. in shale.

CANADIAN FIELDS

Devonian Test Starting In Pekisko Hills

CHATHAM, Ont.—Important operations are to be undertaken on the Pekisko Hills structure south of Turner Valley, where Highwood-Sarcee Oils of Calgary and associated interests will deepen Pekisko-Hills 1, LSD 6, 6-17-2w5, to test the Devonian limestone. This well, started in 1934, discontinued drilling in the Banff shale at 4,400 ft. after going through Madison limestone from 1,308 to 2,910 ft. with no signs of water but a good show of 35 A.P.I. crude at 3,145 ft. It is expected 1,000 to 1,500 ft. more drilling will test the underlying Devonian limestone. The Rundle limestone around 3,100 ft. showed considerable gas. Location is on a high point of the structure. In addition, a tentative location has been made for a second test of the Madison limestone. Gulf Research & Development has secured reservation of 108,200 acres south of the Highwood-Sarcee holdings.

Taber. — The Taber field in southern Alberta is becoming an increasingly important producer. In addition to the Taber-Province discovery well, making around 200 bbl. daily, Dominion 37-18-B, LSD 15, 18-9-16w4, finished at 3,176 ft., had 150 bbl. daily initial production and is making around 145 bbl. Dominion 57-18 B, LSD 5, 17-9-16w4, finished at 3,184 ft., is reported good for 60 bbl. daily. Imperial-Clancey 1, LSD 13, 1-9-16w4, is below 2,927 ft. and near completion; and Dominion 31-19-B, LSD 2, 19-9-16w4, is below 1,836 ft. In the Chin Coulee area, Dominion Chin-Province 1, LSD 13, 11-8-18w4, has

(Continued on page 103)

For 27 Years....

WHEATLEY BROS.

PUMP & VALVE MFRS.

Now

FRANK WHEATLEY

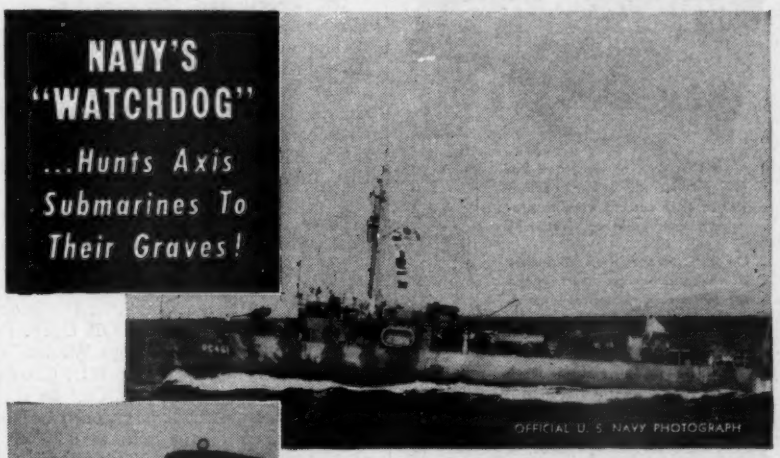
PUMP & VALVE MFR.

HALE STATION

TULSA, OKLA.

NAVY'S "WATCHDOG"

...Hunts Axis Submarines To Their Graves!



OFFICIAL U. S. NAVY PHOTOGRAPH

VIKING FUEL OIL DELIVERY PUMP

Another of Viking's War-time jobs is building fuel oil transfer pumps, as pictured here, for use on the U. S. Navy's fast, hard-hitting sub-chasers . . . one of Uncle Sam's best pieces of insurance against Axis submarines.

The unit consists of a direct-connected Viking Rotary Pump constructed of marine bronze and powered through a flexible coupling to an electric motor, all mounted on a structural steel base. This unit is also furnished for lube oil transfer, in which case it is back-geared to the motor for reduced pumping speed.

Viking appreciates the patriotism and patience of valued civilian customers who are unable to get Viking Rotary pumps at all . . . or who get them only after considerable delay. We're all agreed that the U. S. Navy, which is doing such a whale of a job to win the War on the seven seas, comes first today. The sooner our sub-chasers blast the Axis "pig boats" out of the way, the sooner will final Victory permit our Fighting Yanks to come back home.

VIKING PUMPS — FIRST IN AMERICA

VIKING Pump COMPANY

CEDAR FALLS IOWA

HIGHER CUTTING EFFICIENCY from SEISMOGRAPH BITS

1 Always include at least one Borium insert at the lower, outside corner of each cutting wing to prevent "diamond pointing." (Sketch)

2. On bits larger than 6 inches O.D a second Borium insert on the lower cutting edge improves drilling efficiency. (Sketch)

3. Cover leading faces of all bit wings with Tube Borium, using screen size of at least 10-20 mesh rather than finer meshes such as 30-40. Tests conclusively prove the larger Borium particles greatly increase drilling speeds.

4. Don't skimp on quantity. Tests show that bit life and efficiency is in direct proportion to the amount of Tube Borium applied (up to 1/8" in thickness).

More Seismograph Bits Are Hard-Faced With Tube Borium Than Any Other Alloy

STOODY COMPANY
1138 West Slauson Ave., Whittier, Calif.

STOODY HARD-FACING ALLOYS
Stop wear . . . Eliminate Repair

Among the

Drilling Contractors

John E. Bish Well Servicing Co., Houston, Tex., has the contract for a workover job at 7 Trushel, in the Jennings field, Acadia Parish, Louisiana, for D. D. Feldman.

Gilger Drilling Co., Houston, Tex., will drill 2 Brann for Grubb & Hawkins in the Perkins field, Calcasieu Parish, Louisiana. For the same operators, the contractor will drill 2 Sweet Lake Land & Oil Co. in the Chalkley area of Cameron Parish, 6-12s-12w. The 1 G. L. Wood, recently completed for Grubb & Hawkins in the Lochridge field, Brazoria County, Texas, was a dry hole.

B. & C. Well Servicing Co., Houston, Tex., has started working over 5-B Rio Bravo fee in the Pierce Junction field, Harris County, Texas, for Rio Bravo Oil Co.

Oil Production Maintenance, Inc., Houston, Tex., has started on two workover contracts. One is at 8 Wisdom, in the Damon Mound field, Brazoria County, Texas, for General Crude Oil Co. The other is at 1 Crawford, in the Stowell field, Jefferson County, for Glenn H. McCarthy, Inc.

Grey Wolf Drilling Co., Houston, Tex., was rigging up last week at 1 S. M. Allen, a projected 12,000-ft. wildcat test 8 miles south of Brazoria, on the Allen dome, in Brazoria County, Texas, for Gulf Oil Corp. It was at 7,000 ft. at 1 Hugo Wunesch, in the Yorktown field, De Witt County, for Adams Oil & Gas Co. In the Bear field, Beauregard Parish, Louisiana, it was making hole at 5,250 ft. at 1 Powell Lumber Co. for General Crude Oil Co.

Fitzpatrick Drilling Co., Corpus Christi, Tex., has completed 1 C. E. Wertz, a mile east of Raymondville, in Willacy County, Texas, for Sinclair Prairie Oil Co. This wildcat was a dry hole at 8,519 ft.

Dixie Drilling Co., Houston, Tex., is building road for 8 St. Mary, which it has contracted to drill for Atlantic Refining Co. in the Bayou Sale field, St. Mary Parish, Louisiana. It set 10¾-in. casing last week at 2,000 ft. at 32 L.L.&E., which it is drilling in the Paradis field, St. Charles Parish, for Texas Co. It was at 10,000 ft. at Unit 3-6, which it is drilling for the same company in the Erath field, Vermilion Parish. Dixie last week was completing Unit 35-1 for Texas in the Erath field at a total depth of 11,400 ft.

W. G. Sawyer, Brownwood, Tex., has the contract to drill a 4,000-ft. test ½ mile south of the city limits of Brownwood, Tex., for McGill & Malone, Amarillo operators. The test will be carried to the Ellenburger.

Noble Drilling Co., Ardmore, Okla., has received instructions from Amerada Petroleum Corp., Tulsa, to move rotary equipment to a wildcat location 4 miles east of the Wellington field in Larime County, Colorado. Amerada's wildcat location for 1 Hartshort, C NE SW, 22-9n-68w.

Hollow Drilling Co., Wichita Kans., is credited with opening a new Arbuckle dolomite pool with its 1 Fesler, a Graham County wildcat operation in 25-9n-21w. The well made 28 bbl. of oil in 35 minutes after acid treatment.

George P. Livermore, Inc., Lubbock, Tex., has been awarded the drilling contract on Brown & Wheeler 1 Earl French, a new wildcat location on which a 6,500-ft. Clear Fork lime test is scheduled to be drilled in northwest Hockley County, Texas. The location is 660 ft. from the south and west lines of Labor 22, League 54, Haskell County School Land survey, and is 9 miles northwest of Loveland.

Smith Brothers Drilling Co., Shawnee, Okla., has contract for Ace Gutowsky et al 1 Roy Wilson, SE NW 26-14n-5w. Location is a westward extension of the West Edmond pool into Canadian County, Oklahoma.

John Pate was starting a Travis Peak test at H. E. Ronclean et al 1 Murray, SE SE 22-19n-11w. It is in the Bellevue area of Bossier Parish, North Louisiana.

Big Chief Drilling Co. has contracts for two wells in the West Edmond pool. The two wells will be Dickey Oil Co. 1 Kate L. Young, SE NE 25-14n-5w, about 1½ miles west of pres-

ent production and also in Canadian County, Oklahoma, and the other is Sohio Oil Co. 1 J. M. Young, SW NE 32-14n-4w, in Oklahoma County, Oklahoma. Tools were being moved in for the 1 Young last week.

Rex Drilling Co. has contract for an 8,600-ft. test in the New Holly Ridge pool of Tensas Parish, Louisiana. The well, Union Producing Co. 1 Penrod-Jordan, NE NE 19-11n-10e, was spudded in last week.

Penrod Drilling Co. was starting a 6,000-ft. wildcat for Placid Oil Co. at the 1 McIntosh in SE SE 22-22n-10e, West Carroll Parish of North Louisiana. Location is northwest of the town of Oak Grove.

Halko Drilling Co. was starting work at Phillips Petroleum Co. 1 Sorrels in SE NW SE 3-17n-6e, a west outpost to the Cushing area and some 6 miles due east of the town of Cushing.

Sam Viersen has contract for Flynn Oil Co. and George Deck 1 State School Land in NW NE NE 16-21n-6e, in Pawnee County, Oklahoma. Location is just northeast of the town of Casey. Previous production has been found about a mile south of the location.

Drilling Contractors to Meet in Houston

Brad Mills, executive secretary of the American Association of Oilwell Drilling Contractors, announces that plans for the third annual meeting at Houston, Tex., October 5 and 6, are well under way. Papers are scheduled by N. H. Wheless, Shreveport drilling contractor and president of the association; John A. Chapman, Grey Wolf Drilling Co., Houston, Tex.; J. E. Warren, King Drilling Co., Midland, Tex.; John R. Suman, Humble Oil & Refining Co.; Lyle Cashion, Gulf Oil Corp., and Chase Sutton, Pure Oil Co., all of Houston; Arch H. Rowan, Rowan Drilling Co., Fort Worth, and Howard P. Holmes, Two States Drilling Co., Dallas.

The afternoon of the closing day will be devoted to a symposium with representatives of Petroleum Administrator for War, War Manpower Commission, Selective Service System and other government agencies.

PAW Investigates Labor Shortage in Oil Fields

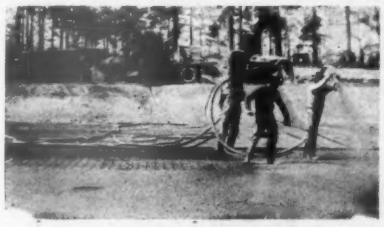
I. V. Horner, PAW representative is now in the Mid-Continent area in an effort to determine how the lack of a proper ruling of the War Manpower Commission regarding exemption of skilled drilling employes from the draft is affecting drilling operations. His investigation follows receipt of scores of complaints from operators.

Many operators had already heard from Raymond B. Kelly, director of production for District 2, urging the operators to cooperate in getting a proper survey of the subject when Mr. Horner called on them.

In his letter, Mr. Kelly wrote:

"The present and approaching critical shortage of manpower in production, drilling and oil-field servicing operations of the petroleum industry warrants serious consideration and immediate attention.

"The regional offices of the War Manpower Commission are not fully acquainted with the serious situation developing within the oil industry and will not be until they are informed of the over-all labor requirements of development and production activities. It is now proposed to furnish the regional offices with such data, but to assist you in doing so it is advisable for PAW to conduct such a survey of all operators in District 2, ascertaining what shortages are anticipated in the various job classifications."



Constructing Gunite salt water disposal pits in East Texas oil field.

GUNITE CONCRETE CONSTRUCTION
for the Oil Industry

An economical, permanent and speedy method of concrete lining for reservoirs, pits and drain ditches. • Gunite lining of steel tanks. • Sand blasting.

FLANDERS CONSTRUCTION COMPANY
5808 Telephone Road
HOUSTON, TEXAS
Phones: Wydown 9-3539 Woodcrest 6-4387

THE QUESTION BOX

Why is it that scores of drilling rig operators now use Armstrong Forged Steel Steam Traps?

For the answer, see your local Armstrong Steam Trap Representative or write ARMSTRONG MACHINE WORKS, 868 Maple St., Three Rivers, Michigan.

STOPS LEAKS—

On Battered Threads!

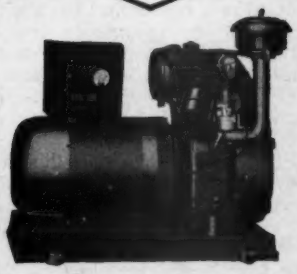
RECTORSEAL is easily applied with a brush, or with any simple swab. It forms a smooth plastic, elastic mass which assures you a leak-proof seal even in badly "nicked" threads. And, when breaking-out time comes, you'll find the connection breaks out much easier because RECTORSEAL, thanks to modern chemistry, retains indefinitely its high lubrication value.

"Your Supply Store has RECTORSEAL in handy container sizes. Ask for RECTORSEAL by name . . . not just a seal."

Export: Lucey Export Corporation
Woolworth Building, New York City

RECTORSEAL
THE POSITIVE LEAK PREVENTER

BETTER RESULTS with STERLING



HOISTS - PUMPS
LIGHT PLANTS

With thousands of new men in Defense Work today . . . every piece of equipment must be easy to operate and efficient. That's why Sterling's Tried and Proven Hoists, Pumps and Lighting Plants the choice of largest contractors everywhere. *Write for literature today!*

STERLING MACHINERY CORPORATION
405-13 SOUTHWEST BLVD., KANSAS CITY, MO

PERSONALS

L. F. PETERSON

Division Engineer Assignment Takes Him Nearer Home

L. F. PETERSON, promoted to division engineer of Stanolind Oil & Gas Co.'s Fort Worth division in July, welcomed his assignment there as he thus moved nearer to his childhood home, Temple, Tex.

After graduating from high school at Temple he entered Texas A. & M. in 1932 and graduated from there as a petroleum engineer in 1936. His first work in the oil fields was for Stanolind as a roustabout from which he entered the company's training program for engineers. He worked in the engineering field offices in the North Cowden, Yates and Slaughter fields before being transferred to Tulsa.

During his 2½ years in the Tulsa office of the company he worked in the petroleum engineering department as a liaison man for the North and West Texas districts.

His chief hobby is following football, Southwest Conference style, which he claims to be the best. Doesn't look for much this fall due to the war but figures he'll have something to shout about after the war. Describes his effort at golf as an attempt.

C. D. Ball, for some time superintendent of the central district pipeline department of Standard Oil Co. of California, has been appointed general superintendent. He has been succeeded as central district superintendent by **E. F. Hudson** and succeeding Mr. Hudson as superintendent of the southern district is **L. E. Joses.**

Second Lt. Horace E. Wright, of Robstown, Tex., who owned and operated Wright Petroleum Co. until he entered war service, is now stationed at Tinker Field, Oklahoma City, where he is a transportation officer.

Sgt. Alvin L. Neimann is back with his company in North Africa, having recovered from wounds suffered early in the campaign. He was awarded the Purple Heart last July 12. Sergeant Neimann was employed by the United Gas Co. in Beeville, Tex., when he joined the Army.

Harry Metzgar, superintendent of Ricgar Oil Co., is running three strings of tools for his company in Wyoming and supervising completion of a small refinery at Greybull to run the production from the old Greybull field. He was in Denver last week in connection with these operations.

N. A. Ludwig, Tulsa, of the Toronto Pipe Line Co., is in Wyoming supervising preparations for the construction of a line from the Steamboat Butte field to a railroad terminal.

Burton Hufford, Standard Oil Co. of California, has been nominated to succeed **C. V. Baxter** as chairman of the Taft, Calif., chapter of the California Natural Gasoline Association. Mr. Baxter has been transferred out of the Taft district and Mr. Hufford recently returned to civilian life, following a period of service in the Army.

Kenneth C. Vaughan has been appointed production foreman of the Dominguez, Calif., district for Union Oil Co. of California.

J. C. Reeder of Union Oil Co. has been appointed manager of the Los Angeles refinery of the company succeeding Ray G. Bray, who died in Washington some time ago while serving on the staff of PAW's Refining Division.

E. D. Pressler, assistant division geologist for Humble Oil & Refining Co., delivered a paper on the Imogene field, Atascosa County, Texas, before the first fall meeting of the Corpus Christi Geological Society, in which he stated that this field is yielding the deepest Edwards lime production in that part of the country.

GEO. SAWTELLE

George Sawtelle, president of Kirby Petroleum Co., Houston, Tex., has been chosen general chairman of the fall campaign of the Harris County War Chest, of which **Col. James Anderson,** long an official of Humble Oil & Refining Co., is president. Mr. Sawtelle is president of the Texas Mid-Continent Oil and Gas Association and a past vice president of the American Association of Petroleum Geologists. He is a graduate of Lehigh University, where in 1916 he was named by his graduating class as its most popular man and its best athlete. New York and Philadelphia newspapers selected him as all-American end, and following World War I, in which he served as a captain, he was named all-A.E.F. end in France. He won the eastern United States middleweight wrestling championship at Madison Square Garden in 1915. On his return from France he was football, baseball and wrestling coach at Northwestern University. He joined Kirby Petroleum Co. in 1921. He has been active for years in welfare work and is vice president of the Houston Chamber of Commerce.

Shifts: **B. L. Pilcher, Jr.,** geologist, Texas Co., Fort Worth to Midland, Tex.; **Ed Shakely,** engineer, Shell Oil Co., Inc., Tulsa, to Centralia, Ill.; **T. M. Lumly,** engineer, Refinery Engineering Co., Ashland, Ky., to Huntington, Wyo.; **H. W. McCormick,** engineer, Carter Oil Co., Magnolia, Ark., to Shreveport, La.; **R. A. Rank,** geologist, Navarro Oil Co., Shreveport, La., to Jackson, Miss.

Frank H. Thrasher, former assistant superintendent of pipe line operations in the Illinois division for Pure Transportation Co., has resigned and accepted an assignment with the Florida Emergency Pipe Line Co.

W. M. Peck, formerly assistant manager of the southwestern producing division for Pure Oil Co.,

Tulsa, has been appointed acting manager of the Illinois division, succeeding **R. B. Kelly,** Olney, Ill., who has assumed duties in Chicago as director of production for PAW District 2.

William F. McKinley, of Calgary, Alberta, formerly associated with British-American Oil Co. and latterly with the United States Engineering Service, Northwest Division, has left for Brandon, Man., to take up duties as sales manager for the Anglo-Canadian Oil Co.

First Lt. Eugene E. Jackson, who was assistant credit manager for Magnolia Petroleum Co. in the Houston, Tex., district when he joined the Army in July 1942, recently received his promotion from second lieutenant. He is serving as assistant subdepot supply officer at the Courtland, Ala., air field.

Marvin S. Charpiot, aviation radio technician second class, formerly employed in the operating department by Houston Oil Co. of Texas, in Houston, has been sent to the Naval Officers Training School at Columbia University, New York. He was an undergraduate at the University of Houston when he entered the Navy.

Lt. Col. Olin G. Bell, formerly geologist for Humble Oil & Refining Co., Houston, Tex., has been made base executive officer of Peterson Army Air Field, Green Mountain Falls, Colo. In the First World War Colonel Bell was a captain in the inspector general's department, and he returned to active military duty in June 1942. He majored in geology at University of Oklahoma and Cornell, receiving degrees from both institutions.

R. E. Hardwicke, Fort Worth, Tex., attorney, has been appointed special counsel for the Petroleum Administration for War. He will maintain liaison and collaborate with state regulatory agencies and will represent PAW before the Interstate Oil Compact Commission. He will have headquarters at Houston, Tex., and his scope of activity includes Arkansas, Alabama, California, Colorado, Illionis, Louisiana, Mississippi, Michigan, Kansas, North Dakota, New Mexico, Oklahoma and Texas.

C. A. Breitung, vice president and director of the Southwest Natural Gas Co., Dallas, Tex., has resigned and will make his future home in San Antonio.

I. Curtis Hicks, geologist with Phillips Petroleum Co., was elected president of the Oklahoma City Geological Society at the annual election last week. Formerly secretary-treasurer, he succeeds **H. Travis Brown,** of Cities Service Oil Co. **E. G. Dahlgren,** technical secretary of the Interstate Oil Compact Commission, was elected vice president, and **Theodore G. Glass,** Sinclair Prairie Oil Co., was elected secretary-treasurer.

Channing Schwartz, formerly of Medford, Okla., has been made district geologist by Carter Oil Co., and transferred from Shreveport, La., to Magnolia, Ark.

James E. Buckley, superintendent of the land department in Oklahoma and Kansas for Sun Oil Co., has been transferred to Houston, Tex., where he will cover the Gulf Coast and Southwest Texas fields.

Hial Gernert, district superintendent for Texas Co., has been transferred from Hamilton, Colo., to Cut Bank, Mont.

Ralph S. Powell, formerly chief geologist of the Oklahoma-Kansas division of Texas Co., has resigned from the company after 15 years' service, and has opened an office in Dallas, Tex., as consulting geologist.

Benjamin F. Pilcher, Texas Co. geologist in Fort Worth, Tex., has been transferred to Midland, Tex., where he will serve as district geologist for the West Texas division, replacing **L. C. Thomas,** who has entered consulting work.

Roy H. Trumpeter, in charge of Shell Oil Co., Inc.'s district scouting office at Centralia, Ill., for the past 3½ years, left recently for Saginaw, Mich., where he has assumed charge of the company's scouting office. He has been succeeded in Centralia by **A. E. Palmer.**

N. C. Davies, consulting geologist at Mount Vernon, Ill., has joined Bell Brothers at Robinson, Ill., as chief geologist.

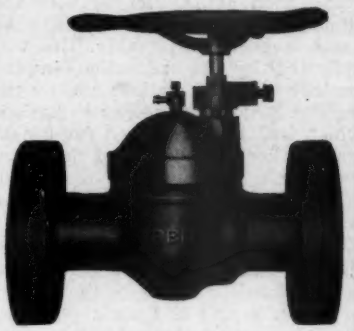
A. Douglas Jamieson, Detroit, Mich., has been appointed manager of industrial relations for the White Star-Ohio division of Socony-Vacuum Oil Co., Inc. He is a former vice president of Guardian Trust Co. of Detroit, and more recently was with the War Department's ordnance district in that city.

Capt. Harold E. Granberry, former oil man of Houston, Tex., and quartermaster of the Fifth Ferrying Group at Love Field, Texas, last week was promoted to the rank of major.

Paul A. Lederer, who prior to entering the armed forces, was employed by Stanolind Oil & Gas Co. as an engineer, has been commissioned a second lieutenant in the U. S. Army Corps of Engineers. Lieutenant Lederer made his home in Houston, Tex.

ORBIT VALVES

THE VALVES THAT CAN "TAKE IT"



Orbit Master Valve

ORBIT MASTER VALVE

The Orbit Master Valve is quick opening—has easy operation and a positive shut-off. A welded bonnet valve—insurance against possible gasket leaks.

YOUR ORBIT VALVES will last for the duration. Meanwhile, if you have any questions regarding their care or maintenance, write us.

OIL WELL IMPROVEMENTS CO.

Since 1912

TULSA, OKLAHOMA

Market Developments

East Coast

NEW YORK.—The gasoline shortage which resulted in the closing of many service stations in the northern section of District 1 since the elimination of the pleasure-driving ban has eased considerably. This was indicated by the reduction in the number of closed stations and by the reclassification of selected stations which had been reserved for use of war workers. A number of the latter are again allowed to serve all customers and federal supervision has been withdrawn.

Some service-station operators met the problem of low supplies and excess demand by reducing their hours of operation to 2 or 3 per day. Others attempted to restrict sales to regular customers in defiance of antidiscrimination regulations but, as a result of OPA warnings, this practice has been generally discontinued.

In spite of the heavy drain on existing East Coast supplies as a result of the excessive gasoline demands, the index of available supplies continues to rise. The latest increase of 1.2 points raised it to 40.3 which compares with 59.1 a year ago. The continued rise in the index despite the heavy gasoline consumption indicates a substantial improvement in fuel-oil stocks, an indication confirmed by companies reporting "satisfactory" heating-oil inventories.

A contributing factor to the comparatively tight over-all position in District 1 is the delay in inaugurating operations on the Bayway-Bayonne branch of the big-inch line. While the southern leg has been delivering close to 170,000 bbl. per day to Philadelphia district refineries a series of breaks, the eighth of which occurred last week, has delayed the opening of the northern leg, only about half of which has been fully tested so far.

Pacific Coast

LOS ANGELES, Calif.—The recent order of PAW prohibiting the sale to civilian consumers on the Pacific Coast of diesel fuel of 40 cetane or higher until after the military demands have been met will not have a significant impact in markets because there is no abundance of products meeting this specification on the West Coast. An acute shortage has made it necessary to import 50-cetane diesel fuel into California. While no data are available as to how much is being moved into military stock piles the movement has become of prime importance and the amount on hand has shown a substantial increase.

High-quality diesel fuel meeting Navy specifications is a prime requisite of the submarine fleet and every effort is being made to accumulate sufficient stocks to meet needs of all naval vessels.

Independent refiners will be obliged to test all diesel sold after the deadline in order to be sure their product does not exceed maximum specifications. Many independent refiners have not had the testing equipment or have not undertaken tests to indicate the cetane rating.

Importations of 50-cetane diesel into District 5 are expected to continue until the desired amounts have been accumulated. This importation clearly indicates the shortage of gas oil and light distillates in District 5 and is the reason why most marketers have been paying top prices for all quantities offered.

Natural gasoline is very tight and is practically unobtainable.

Mid-Continent

BUYERS this week started applying price pressure to residual fuel oils in the Middle West refinery market because of the disproportionate increase in stocks of heavy burning products. Refiners resisted efforts of purchasers to drive prices into lower ground but there was general agreement that a continuation of the current trend will make it difficult to maintain quotations at ceiling levels.

Interest was more active this week in light fuel oil. Distributors in the Chicago area, in North and South Dakota and other northern states were moving substantial volumes into tanks of domestic consumers and replenished their bulk inventories on a balanced basis. Efforts to purchase for long-term delivery were rejected by refiners who are still hopeful that ceiling prices will be adjusted upward. They are confident, according to sentiment in the trade, that kerosene and other light fuels will continue scarce and that the risk of declining prices is so slight that long-term contracts hold little inducement for the manufacturer.

Demand for natural gasoline continued to exceed supplies. Purchasers were willing to pay substantially above current quotations in order to locate stocks but the large producers and sellers were unable to accept additional business. Most suppliers are substantially short of their firm commitments and are restricting shipments to regular customers.

Gulf Coast

HOUSTON, Tex.—While appeals for gasoline and light distillates grow in urgency, the demand for heavy-grade fuel oils exhibits an easier tone, according to Gulf Coast refiners and marketers. In the case of the heavy fuel oils, for which the Navy, the railroads, and industrial plants on the East Coast were clamoring a few weeks ago, the peak of requirements apparently has been passed.

Supplies of gasoline for civilian use continue to sink steadily to lower levels, with buyers combing every possible source in the hope of picking up an odd car here and there. No figures are given out on the quantity of aviation gasoline being produced, but as Gulf Coast refineries are reported to be running at about 97.8 per cent of operating capacity, the output of this vital war material is clearly tremendous. Few refineries now are offering third-grade gasoline. By introducing lead at a cost of about a quarter-cent a gallon, they can convert third-grade material into a house-brand motor fuel commanding a cent a gallon more in the market. This additional profit of ¾ cent has the inevitable effect of keeping supplies of cheap gasoline at a low level.

Transportation no longer presents a problem of consequence, refiners say. Most of them report that all the cars they need are available, such difficulties as occasionally arise being local. "Our trouble is making material to put into the cars," said one refiner.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)
Week Ended September 4, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	155	2,160	539	898
Ind., Ill., Ky.	719	13,723	3,311	5,823
Okla., Kan., Mo.	357	6,139	1,717	2,090
Censored area*	2,163	30,695	17,122	17,063
Rockies	102	1,278	44,237	12,394
Total 9- 4-43	4,214	71,402	67,675	38,673
Total 8-28-43	4,227	72,525	67,250	37,928
Total 9- 5-43	3,675	79,093	76,802	43,428

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS
(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
September 4, 1943	234,835,000
August 28, 1943	236,170,000
September 5, 1942	246,942,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of September 14)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	70-72	68-70	63-66
Mid-Continent*			6.000		5.625
Pennsylvania		6.750-7.000			
Gulf Coast	6.00-6.50		§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80		9.2	9.2	
California	6.750-7.500	6.250-6.500	6.125-6.250	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500	4.375	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				4.125	

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C†
Mid-Continent*	4.125					$0.80-1.27
California		2.750-4.000			‡1.35-1.45	0.85-1.00
Gulf Coast			4.000	4.125	1.45	0.85-1.27
Northeast Coast				6.800	2.780	1.65-2.07
North Louisiana						0.80-1.27

*Basis Oklahoma Group 3. †Gravity range. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.35	§1.10-1.15
Gulf Coast	3.750-3.875		1.35	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.375	5.125
North Texas	4.000	4.750
North Louisiana	4.125	4.875
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)		9.60
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oils

Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—		
0-10 pour point:		
200-3		15.00
300-3		18.00
500-3		19.50
600-3		20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Neutral Oils

Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	14.10	4.50	10.60
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.60
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.60	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.80
Minneapolis, Minn.	15.90	5.50	10.60
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.30	4.50	8.70
Average 14 cities	17.46	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.50

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.59	5.96	10.92

California Fields

(Continued from page 89)

drill and complete 14 new wells during the remainder of the current year and early in 1944 so that there will be sufficient natural gas and distillate to permit operation of the recycling unit which is already under way and which will be finished by February of next year.

Round Mountain. — Bandini Petroleum has cored 12 ft. of good-looking Vedder oil sand in 1 Signal-Mills, a wildcat test located about 1½ miles southwest of the Round Mountain field. There does not appear much prospect of extending the southern limits of the Round Mountain field so that this well, if complete, will open up a new oil field in Kern County. The Vedder sand of Miocene age is exceptionally productive in Kern County and the outlook for a good well is very bright. This wildcat is scheduled for an early test.

Fresno County.—General Petroleum is making a series of tests in 1 Burrel in order to determine production possibilities of the Miocene in this wildcat which was originally abandoned as a duster at 9,400 ft. When Superior a short time ago succeeded in getting commercial production in a thin streak of Miocene oil sand in the Lanare-Wheatville district General Petroleum decided to reenter the Burrel wildcat and attempt to duplicate the feat. To date formation tests at 6,510-20 ft. and 6,242-57 ft. have only showed minor showings of oil and gas as the principal recovery consisted of fresh and salt water along with sand and mud. A test is now being made of an interval higher up in the hole but still within the Miocene section.

COASTAL DISTRICT

Ventura County. — Standard made a formation test of showings found in its Fillmore wildcat in 24-4n-20w at 6,925 ft. but the recovery was unfavorable and drilling operations were resumed. In the Piru area, Standard's 1 Crestmont, which also showed some interesting indications, is also prospecting ahead in search of a good oil sand. This well is located not far from Continental's discovery on the Ramona anticline. Continental found the formations in this region so tight that it takes several hundred feet of oil sand to make a small pumping well.

WILDCAT COMPLETIONS

Los Angeles Basin

Riverside district, Riverside County: Supreme Oil Co. 2 Supreme, 2-2s-4w, dry at 1,325 ft.

San Joaquin Valley

Comanche district, Kern County: Frank Goldman 1 Johns, 32-12-18e, dry at 1,604 ft.

R. S. Miesse 2 Johns, 32-12n-18e, abandoned as incompleted, T.D. 950 ft., objective was not reached due to abandonment of 1 Johns.

Jacalitos district, Fresno County: Standard 2-1 Camino, 31-21s-15e, dry in Miocene gray sand, T.D. 3,648 ft., found Temblor objective barren.

Mountain View district, Kern County: V. & C. Oil Co. 1 Bigelow, 1-31s-29e, dry at T.D. 2,053 ft.

Polvadero district, Fresno County: Standard: Standard 1 Bordieu, 1-21s-16e, abandoned because of mechanical difficulties, T.D. 4,108 ft.

Porterville district, Tulare County: Tide Water Associated Oil Co. 76-21 Porterville, 21-21s-26e, dry, T.D. 2,595 ft.

Suisun district, Contra Costa County: Standard 1 Keller, 26-2n-1w, dry at 4,133 ft.

West Rio Vista district, Solano County: Texas 74-7 Stewart, 7-4n-1e, dry in upper Cretaceous, T.D. 4,182 ft.

LEGAL

U.S. DEPARTMENT OF THE INTERIOR District Land Office, Cheyenne, Wyoming Notice is hereby given that the lands here in described within the known geologic structure of the Boone Dome gas field Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226), at a sale to be held in the district land office at Cheyenne Wyoming, at 10 o'clock a.m. on September 30, 1943, of the following parcels: Parcel No. 1, T. 35 N., R. 85 W., sec. 9, NE¼NE¼ N½NW¼, SE¼ NW¼, E½SW¼, W½SE¼ SE¼SE¼; sec. 10, SW¼NW¼, NW¼SE¼ SE¼SE¼; Parcel No. 2, T. 35 N., R. 85 W., sec. 14, W½NW¼, SW¼; sec. 15, E½NE¼, N½SW¼, SE¼SW¼, S½SE¼. Each successful bidder must deposit on the date of the sale a certified check or cash for one-fifth of the amount bid by him, and file a showing of qualifications to receive the lease as required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. In the event one bidder is awarded both parcels, a collective bond in sufficient amount may be furnished to cover the two leases he obtains. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelopes should be plainly marked for opening on the day and hour of the sale. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior William G. Johnson, Register.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the N½NW¼ sec. 14, T. 26 N., R. 90 W., 6th P.M., 80 acres, Lost Soldier oil and gas field, Wyoming, is offered to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226) at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on September 30, 1943. The land will be offered in a single unit. The successful bidder must deposit on the date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid and the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	**$1.35**
Conroe	**1.43**
Tepetate, Louisiana	**1.18**
Illinois basin	**1.37**
Pecos County, Texas	**.95**
Bradford, Pennsylvania	**3.00**
Van, Van Zandt County, Texas*	**1.08**

***No change since 5-21-41.**

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

***Includes Lea County, New Mexico.**

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the East Lance Creek oil and gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226) at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on October 14, 1943, in the following units: Parcel No. 1, T. 36 N., R. 64 W., sec. 28, W½SE¼; Parcel No. 2, T. 36 N., R. 64 W., sec. 29, E½ SE¼. Each lease will be made subject to the unit plan for the East Lance Creek Unit Area, Wyoming, approved March 2, 1938. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. In the even the same bidder is the successful bidder on both parcels, he may consolidate them into a single lease since the total acreage does not exceed 640 acres. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

AMONG EQUIPMENT MEN

Timken Appoints Richardson West Coast Manager

Timken Roller Bearing Co. recently announced the appointment of W. H. Richardson as general manager of all activities of all divisions of the company on the entire West Coast and in the Orient. He will headquarter in San Francisco, Calif.

Mr. Richardson came with Timken in 1917, serving in various sales capacities until 1929 when he was made manager of Timken Roller Bearing Service & Sales Co., and vice president of Timken Roller Bearing Co., Ltd., Canada, in which capacities he handled the sales of bearings for replacement in the United States, Canada, Latin-American countries and the Orient.

In 1941 he was made assistant general sales manager of Timken Roller Bearing Co.

Seiler Named Vice President Of Tube Turns, Inc.

John G. Seiler has been elected vice president of Tube-Turns, Louisville, Ky., manufacturers of Tube-Turns welding fittings and flanges. Mr. Seiler will continue as sales manager.

T. H. Wickenden Heads Inco Division

Appointment of T. H. Wickenden as manager of the development and research division of International Nickel Co., and H. J. French as assistant manager is announced by Robert C. Stanley, president of the company.

Mr. Wickenden, who has been assistant manager of the division since 1931, succeeds the late Albion James Wadhams. He is well known in engineering circles in the automotive industry, having been in charge of engineering at Studebaker Corp.'s South Bend plant from 1913 to 1920. Mr. Wickenden joined International Nickel in 1922 when he was placed in charge of developments in the automobile field for the development and research department at New York.

Mr. French is temporarily serving in the Steel Division of the War Production Board in Washington, D. C. He has been in charge of alloy steel development in International Nickel's development and research division at New York since 1932, previous to which he had been a member of Nickel's research laboratories in Bayonne, N. J., for 3 years.

E.L.I. Appoints Reed Vice President in Charge of Production

Engineering Laboratories, Inc., consulting engineers and manufacturers of Tulsa, have announced the appointment of Harold E. Reed as vice president in charge of production. With over 15 years' production experience, he comes to E.L.I. with an outstanding record as production manager of Cessna Aircraft Co. of Wichita, Kans., and with extensive production experience with other nationally known manufacturers such as Frigidaire Corp.

Mr. Reed served as head of the planning and production department of Waco Aircraft Co. and production engineer of Curtiss-Wright and the Beech Aircraft Corp. He is particularly experienced in production of highly specialized precision equipment, especially fitting him for his work at E.L.I.

R. M. Cook Appointed Security Sales Manager

Security Engineering Co., Inc., Whittier, Calif., has announced the appointment of R. M. Cook as sales manager. Mr. Cook is well known in the oil industry and brings to the firm an extensive background of oil-field experience, having spent his entire career in the oil business. He was associated with Byron Jackson for 11 years as sales manager and was active in conjunction with that firm in organizing Pacific Cementing Co., now known as International Cementers, Inc., in which he carried out the duties of vice president and general manager. He later became associated with McCullough Tool Co. in the capacity of sales manager.

In recognition of Fisher Governor Co.'s outstanding production record, the Army-Navy "E" Award was presented to this organization on July 14 at Marshalltown, Iowa. For over 2 years Fisher's entire production has been devoted to war materials. Shown here with N. T. CHADDERDON, president, extreme left, and Army and Navy officials, are Fisher veterans of 25 years or more service. Total years service of this group exceeds 360 years.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

Classified display advertising set in single or double column style:

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

SITUATIONS WANTED

LAND AND TITLE MAN, legally trained, age 36, draft exempt. Twelve years' experience in title work and buying leases in Louisiana, Mississippi and Mid-Continent. Working knowledge of geology. Box B-780, The Oil and Gas Journal, Tulsa, Okla.

25 YEARS experience all phases of oil business. 15 years superintendent of one of the largest oil refineries in Mid-Continent Familiar with newest processes and construction methods, and personnel problems. Box B-754, The Oil and Gas Journal, Tulsa, Okla.

SUPERINTENDENT, Chief Chemist, Process Supervision and development. Fourteen years experience in all phases of refinery operations. Includes asphalts, waxes, and specialties. M.I.T. Chem. Eng. graduate. Box B-762, The Oil and Gas Journal. Tulsa, Okla

GRADUATE ENGINEER, 3A Classification, six years experience oil production, two years experience plant and equipment design. Wants permanently located position with producing company or equipment manufacturers. The Oil and Gas Journal, Box B-800, Tulsa, Oklahoma.

CHEMIST: Age 32, College graduate with 10 years' experience with major oil company in various gasoline problems, water, gas and gasoline treating, laboratory work. Direct work and supervision in this field. Married, one child, draft status 3-A. Now employed, change desired for personal reason. Correspondence invited, will be confidential. The Oil and Gas Journal, Box B-802, Tulsa, Oklahoma.

ADJUSTER - INVESTIGATOR: Practical experience land and leasing, settlements, contracts, hearings and investigations relating producing, refining, transporting; licensed attorney in several producing states. Over draft age. The Oil and Gas Journal, Box B-807, Tulsa, Oklahoma.

COMPETENT EXECUTIVE mechanical engineer desires stable connection with progressive concern offering potential field for advancement in post-war work. Have had ten years successful experience in the design, development and sale of oil field machinery. Thorough investigation may lead to mutually satisfactory affiliation. 3A classification. The Oil and Gas Journal, Box B-803, Tulsa, Oklahoma.

ACCOUNTANT-AUDITOR — Thoroughly familiar with all phases of oil and gas accounting, and taxes. Available October 1. Box B-792, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

DRILLERS—$10.00, Tollies—$8.40, 8 hour day. Steady employment guaranteed, water wells, Milwaukee District. Apply Midwest Drilling Co., 3032 Plankington Bldg., 161 W. Wisconsin Ave., Milwaukee, Wisconsin.

WANTED: Men with Geophysical experience, also mechanics, parts men, radio men and machinists. Independent Exploration Company, 901 Esperson Bldg., Houston, Texas.

• • • • WANTED • • • •

Major oil company with continent-wide operations and research seeks graduate technical men of the following qualifications:

MECHANICAL ENGINEERS—with petroleum refinery or similar experience. Should be familiar with refinery design, estimating, construction, mechanical equipment, engineering materials, and utilities systems. Process knowledge desired although not essential.

CHEMISTS AND CHEMICAL ENGINEERS interested in research, design, or plant operation. Should have training and experience in refinery or other industrial organizations.

Work not of a temporary nature. In reply state experience, education, age, marital status, draft classification and salary expected, include small snapshot (not returnable). Replies strictly confidential. Applicants now employed at highest skill in war industries not solicited. Box B-670, The Oil and Gas Journal, Tulsa, Okla.

• • • • • • • • • • • • • • • • •

WANTED — EXPERIENCED REFINERY STILLMEN, OPERATORS, PUMPERS, INSTRUMENT MEN AND MECHANICS For new Aviation Gasoline Refinery consisting of Catalytic Cracking, Alkylation, and Isomerization Units. Location, Middlewest. In reply give detailed outline of previous experience, education, draft status, and required earnings for 48-hour week. Reply Box B-768, The Oil and Gas Journal, Tulsa, Okla.

SUBSTANTIAL and progressive Independent Oil Company desires Geologist who has wide experience in Mid-Continent field. Salary not less than $750.00 per month to start. Good opportunity for advancement. No objection to Geologist making oil investments so long as it does not interfere with company's business. State experience, references. Post Office Box 1805, Fort Worth, Texas.

HELP WANTED

HELP WANTED

Chemical engineer for process design work on petroleum refinery gas recovery and light ends handling units. Five years experience with refinery equipment manufacturer or refiner required. Outline education, experience, draft status, and salary in first letter. Box B-741, The Oil and Gas Journal, Tulsa, Okla.

LAND AND LEASEMAN wanted by oil and gas company. Permanent position. Give references and experience. Must be between 25 and 35 years of age and not subject to immediate induction. The Oil and Gas Journal, Box B-804, Tulsa, Okla.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

ROYALTIES

I WANT PRODUCTION Royalties in any field. Send full details to Box B-805, The Oil and Gas Journal, Tulsa, Okla.

EQUIPMENT FOR SALE

FOR SALE: Steam Drilling Rig complete, equipped with engine, chains and guards. Boiler feed unit. Three 110 HP boilers and drill pipe. First class condition. Rogers Truck Line, Kilgore, Texas.

FOR SALE: Approximately 5000 feet of 4½" left-hand drill pipe; also 6" Kelly with connection for running same. This drill pipe is made up in doubles of about 45 feet. All tool joints and collars have heavy welds. Box B-789, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: 9—Vertical tanks 20' x 6' 3/16" plate riveted.
1—Vertical tank 24'x12' 3/16 plate riveted.
2—Bubble Towers 4' x 30 x 3/8" 6 trays in each.
1—Steam Compressor 7 x 8 x 10 Horizontal.
All above material good condition at attractive prices. Located Alexandria, La. P. O. Box 1421. Phone 2-1740.

FOR SALE: Cable Tool Unit consisting of 3—Ford V-8 Motors, Multiple Driven (each with clutch) to an OCS Reverse Clutch with Chain Driven OCS Sand Reel Complete with Steel Rig Front and Portable Steel Bull Wheels, each unit separately mounted on Steel Skids. Entire unit purchased new and has drilled only one well from 4000' to 6000' in depth.
LUCEY PRODUCTS CORPORATION
Tulsa, Okla.

FOR SALE: One 2A National Drilling Rig with Heavy Steel, Bull Wheels, Mast, Shear Poles and Walking Beam—Spudding Attachment, 150 H.P. Climax Drilling Engine and Reverse Clutch complete with tools and steel housing. The Siosi Company, Terre Haute, Ind.

1—Stabilizer 30" x 54'6", 30 trays, 300# test, 200# working pressure. Column fairly complete with pumps, piping, controls, etc. C. J. Smith, 532 Beacon Bldg., Phone 5-3416, Tulsa, Okla.

FOR SALE: Semi-Tank Trailer, capacity 2035 gallons. Complete with pump and fifth wheel. Five good tires. Price $600 cash. Glen Goodbar, Phone 1011, Coffeyville, Kansas.

COMPLETE GASOLINE PLANT SHUT DOWN SEPTEMBER 1st

- Bessemer Direct Driven Compressors
- Distillation Unit
- Horizontal Storage Tanks
- Pumps
- Buildings
- Laboratory Equipment

Call—Wire—Write

PRODUCERS PIPE & SUPPLY CO.
Box 1814, Tulsa, Okla.
Phone 2-1188. LD 501

Classified Advertising

EQUIPMENT WANTED

WANTED

Several Steel Clad Buildings

30′ to 60′ wide
(Or wider if you have them)
and
100′ to 500′ long.

Please give all details, location, and price.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, Illinois

WANTED

Used storage tanks:
Pressure Tanks:
All sizes
Send us your list

SONKEN-GALAMBA CORP.
106 N. 2nd St., Kansas City, Kansas

WANTED

1—7" Cameron 6000# Test, Pressure Operated, Flow Line Valve.

1—10¾" Cameron 6000# Test, Pressure Operated, Master Valve.

1—7" Cameron 6000# Test, Pressure Operated, Blowout Preventer.

We are interested in new and used equipment. Do not offer used equipment unless in perfect operating condition. Quote condition and price. Danciger Oil and Refining Co., Fort Worth, Texas, LD 142, G. B. Magruder, Jr.

WANTED: One Landis Pipe Threading machine, capable of threading 2" to 7" pipe. Must be in A-1 condition. AMERICAN SUPPLY COMPANY, Box 1500, Kilgore, Texas.

WANTED

Used Structural Steel
Pipe — Valves
Fittings
Send us your list

SONKEN-GALAMBA CORP.
106 N. 2nd St., Kansas City, Kansas

BUSINESS OPPORTUNITIES

OIL MUD SCREENS

The manufacturer of well-known equipment of proven efficiency for industrial uses of similar characteristics now operating at capacity willing to grant license on reasonable royalty or lump-sum basis to established manufacturer of oil-field equipment for manufacture, use, and sale in that field of modifications specially adapted to particular purpose. Shop drawings and other manufacturing information available will minimize if not eliminate usual development expense. Box B-752, The Oil and Gas Journal, Tulsa, Okla.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

LEASES AND DRILLING BLOCKS

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

FOR SALE: New state oil and gas leases Lea, Eddy and San Juan counties, New Mexico. Easy payments—free map and circulars. Wm. C. Uphoff, Box 703, Peoria, Ill.

DRILLING BLOCK, 8,000 acres, full geology, geophysical, core drilled to gas. Oil production probable 3,000′ depth. Want deal on development proposition. S. W. Pressey, Pueblo, Colo.

DEALERS, Oil and Gas Leases: Get in touch with us for leases inside drilling blocks in Kentucky at once. Prices right, real oil play in the making. Dobbs Oil & Gas Co., 504 Wilson Bldg., Dallas, Texas.

CONGRESS OPENS Oil Reservation lands to lease American citizens. It's opportunity to file developing oil area. Box B-782, The Oil and Gas Journal, Tulsa, Okla.

GEORGIA LEASES: 8500 Acres New Five Year Leases, Ten Cent Rental, Adjoining Major Company Block. Will sell or deal for 6000 foot test. Write for details. Box B-793 The Oil and Gas Journal, Tulsa, Oklahoma.

HERE is a good buy. New 50 acre lease ½ mile from production, $6 per acre. C. A. Parker, Box 451, Center, Texas.

NEW MEXICO
State Oil and Gas Leases
TWO DEEP TESTS UNDER WAY—one a 7,500 ft. test; the other a 6,000 ft. test. 40 acres and multiples thereof for sale in the HoT SPoT. Write for information. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, New Mexico.

ATTENTION OIL MEN: Come to St. Clair County, Mo., to Lease and Drill. Indications are good. Leases can be had for the asking. We will give physical aid. See Mrs. Mate, Route #3, Osceola, Mo.

NEW 69 acre, 10 year lease, less than one mile from production, Shelby County, Texas. Priced $3.50 per acre. Good buy! Write C. A. Parker, Box 451, Center, Texas, for details.

TO LEASE for Immediate Development. 160 Acres in Oklahoma, adjoining Major Oil Companies Geologized tract. Good possibilities for big production. A. E. Saunders, 205 Howard Street, Millville, New Jersey.

LOOK at this new 80 acre lease, close up to producing well, $3.50 per acre. Other wells to drill. Write Box 451, Center, Texas.

FOR SALE: Will furnish 247, or 282 acre oil and gas lease, drill and case one well on either lease for $1,000.00. Both leases in oil territory, but different sections. W. P. Harley, Bowling Green, Kentucky.

Canadian Fields

(Continued from page 91)

spudded and is below 157 ft. with 10-in. casing set. Mid-Continent Oil & Gas and Alberta Petroleum Operators will drill two joint tests, No. 1 in LSD 9, 31-7-16w4, and No. 2 in LSD 14, 24-6-15w4.

Alberta royalties. — The Alberta government has announced a modification of previous rulings in regard to royalties on provincial leases. Royalties levied or collected in any month prior to January 1, 1943, in excess of 10 per cent on production from wells drilled, drilling or financed prior to June 1, 1941, will be refunded. The standing of holders of old federal leases, who felt they were unfairly dealt with when required to take out provincial leases, is also restored. Operators when making their August returns are required to state whether they are operating under the flat royalty or the alternative sliding scale.

Crude and natural gasoline production from all Alberta fields in July totaled 816,776 bbl., or 26,438 bbl. daily, an increase of 3 bbl. over the June daily average but a decrease of 820 bbl. from the daily average for July

July production in most of the outside fields showed increases over June, the most noteworthy gain being in Vermilion, up from 6,092 to 9,998 bbl. The Taber field in southern Alberta was up from 6,753 bbl. in June to 8,956 in July. Several areas that had been off production came back with small shipments, notably the Tilley field which delivered 1,821 bbl.

Alberta's natural gas production in July was 3,683,835,000 cu. ft. compared with 3,697,220,000 in the same month last year. Production for the various fields, in thousands of cubic feet, was: Turner Valley, 3,191,084; Kinsella, 229,653; Medicine Hat, 175,396; Redcliff, 58,815; other fields, 28,887. As compared with July 1942, Turner Valley waste gas decreased from 1,926,311,000 to 1,833,433,000 cu. ft.

Canadian production.—Official figures of crude production from all Canadian fields for the first 6 months of 1943 show a total of 5,037,870 bbl. against 5,240,038 bbl. in the same period last year. The Alberta output was down from 5,144,482 to 4,867,491 bbl.; and Ontario dropped from 73,865 to 66,737 bbl. The small New Brunswick output gained from 12,017 to 13,713 bbl. The most encouraging area was the Fort Norman field in the Northwest Territories, where the output for the January-June period jumped from 9,674 bbl. in 1942 to 89,929 bbl. in 1943. In June the Fort Norman field produced 17,402 bbl. against 9,528 bbl. for the same month last year. Natural gas production from all Canadian fields in June, not including waste gas, amounted to 2,513,464,000 cu. ft. against 2,361,652,000 cu. ft. in June 1942.

ADVERTISERS IN THIS ISSUE

Acme Fishing Tool Co. 86
Ajax Iron Works 85
American Iron & Machine Works .... Back Cover
Armstrong Machine Works 93
Automatic Temperature Control Company, Inc. 17
Bantam Bearings Div. The Torrington Co. 4
Beeson Bros. Engineering Co. 70
Bethlehem Supply Company 1
Bigelow-Liptak Corporation 16
Brown-Strauss Corp. 75
Cameron Iron Works, Inc. 58
Century Electric Company 74
Chemical Construction Corporation 8
Chevrolet Motor Division, General Motors Sales Corporation 12
Classified Advertising 100-101-102-103
Cleveland Trencher Company 77
Columbian Steel Tank Co. 90
Continental Oil Co. 15
Continental Supply Company, The 78
Cooper-Bessemer Corp., The 36-37
Coppus Engineering Corp. 3
Crane Co. 7
Cummins Engine Company 10
Dean Brothers Pumps, Inc. 14
Dow Chemical Company 18
Dresser Mfg. Co., The 2
Enardo Foundry and Mfg. Co. 81
Findley Co., The F. G. 70
First National Bank in Dallas 88
Flanders Construction Company 93
Fraser-Brace Engineering Co., Inc. 75
Gaike Corporation 51
General American Transportation Corporation—Terminal Division 17
Geophysical Service, Inc. 20
Halliburton Oil Well Cementing Co. .... Inside Front Cover
Hazard Wire Rope Division of American Chain & Cable Co., Inc. ..... Inside Back Cover
Hills-McCanna Co. 14
Hughes Tool Co. ..... Front Cover
Johns-Manville Corporation 65
Jones Co., The S. M. 55
Ladish Drop Forge Co. 84
Lane-Wells Company 66
McCord Radiator & Mfg. Co. 77
McDermott, Inc., Tom P. 84
Mid-Continent Supply Company 10
National Airoil Burner Company, Inc.. 75
Norton Company 13
Oil Center Tool Co. 87
Oil Well Improvements Co. 85
Perco Division of Phillips Petroleum Co. 47
Pittsburgh Plate Glass Co. Columbia Chemical Division 6
Plomb Tool Company 58
Rector Well Equipment Co., Inc. 93
Reed Roller Bit Company 48
Roebling's Sons Company, John A. 68
Sharman and Allen 77
Smith Meter Company 14
Socony-Vacuum Oil Co., Inc. 8
Spang, Chalfant, Inc. 60-61
Spicer Mfg. Corp. 72
Sterling Machinery Corporation 93
Stoody Co. 73-76-92
Sullivan Machinery Company 44-45
Taylor Instrument Companies 5
Timken-Detroit Axle Co. 82
Union Paste Company 70
Universal Oil Products Co. 38
Viking Pump Co. 91
Vulcan Steel Tank Corporation 89
Wagner Electric Corporation 11
Wheatley Pump & Valve Mfr., Frank.. 91
Youngstown Sheet & Tube Co. 33
Zink Co., John 54

Journalisms:

HIGHLIGHTING The Journal's Pipe-Line Number, which will appear next week, is an article by W. R. Finney, coordinator of pipe lines, Standard Oil Co. of New Jersey on the postwar uses of the WEP 24 and 20-in. lines. There has been much speculation regarding the future of these lines, whether they can compete with tankers economically, whether they will be converted to gas lines or whether, like so many other war construction jobs, they will be white elephants. Mr. Finney's article, which is the result of much study and reflection on his part and of a great deal of discussion with other pipe-line engineers, will give significant predictions.

Bound intimately to the future of the Big Inch and Little Big Inch lines is the future of major trunk lines throughout the country. The big lines have introduced great economies in construction and operation and experience gained on them has shown how even greater economies can be effected in the future. How far the pipe-line industry will benefit from these experiences and how the lessons learned on the big lines can be used in increasing the efficiency of other lines will also be discussed in Mr. Finney's article.

THE most comprehensive information ever presented in regard to recent petroleum pipe-line construction for the national transportation program will be given in a staff article which has been prepared with the aid of PAW.

A HIGH-CAPACITY products line was built with used pipe and equipment for the Bayou Pipe Line System from Baytown, Tex., to Baton Rouge, La., as a link in the program for extending the Plantation system. Construction and operating data on this line will be the subject of an article by H. H. Anderson, vice president, and C. E. Dolhonde and J. L. Rittiner, engineers of Shell Pipe Line Corp., who have been closely connected with the line.

THESE are but two of the many feature articles which make The Journal's Annual Pipe-Line Number required reading, not only for those whose main interest is in the transportation of oil but also for all in the industry who are in any way affected by that movement.

CALENDAR

September

CONTROLLERS INSTITUTE OF AMERICA, twelfth annual meeting, Waldorf-Astoria, New York, September 20-22.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf-Astoria Hotel, New York City, September 21-22.

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting, Santa Fe, N. M., September 24-25.

October

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS, third annual meeting, Houston, Tex., October 5-6.

PETROLEUM INDUSTRY WAR COUNCIL, regular monthly meeting, Washington, D. C., October 6.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 13-14.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 25.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA annual meeting, Fort Worth, Tex., October 25-27.

PETROLEUM DIVISION NATIONAL ASSOCIATION OF CREDIT MEN, annual conference, St. Louis, Mo., October 25-27.

November

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting. Palmer House, Chicago, Ill., November 8-11.